

SERVING THE FERTILIZER INDUSTRY

50 YEARS

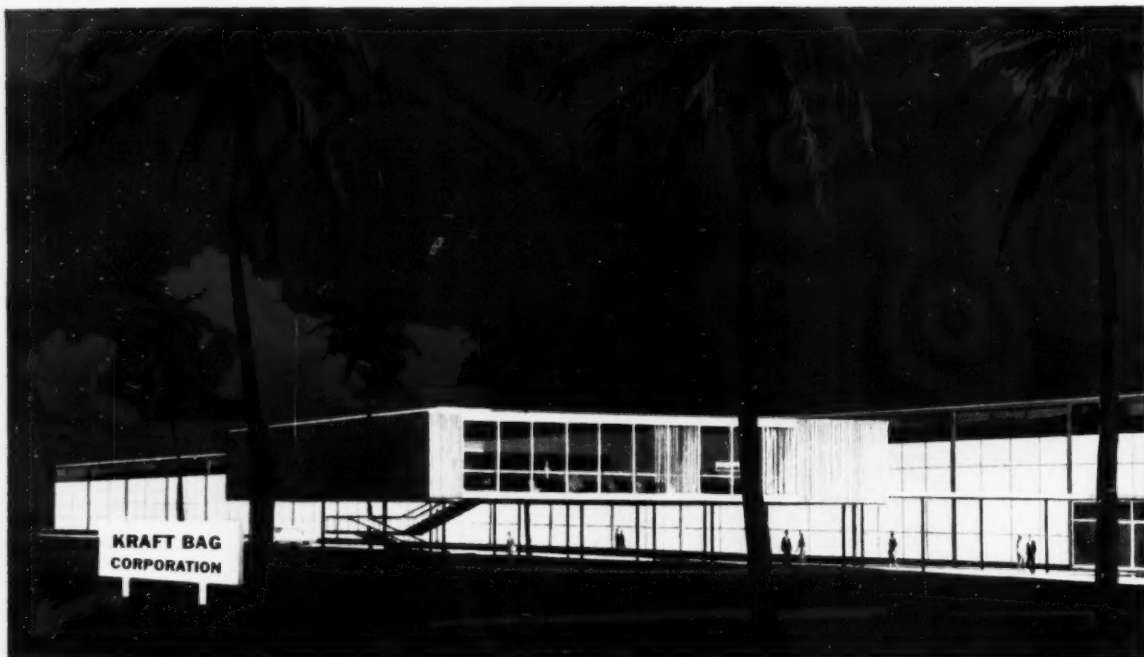
Commercial **F**ertilizer

and **PLANT FOOD INDUSTRY**

April
1960

**HOW TO EXTEND
YOUR SEASON
AND SELL
MORE TONNAGE**

SEE PAGE 19



"It wasn't there last year!"

This is the new 300,000 sq. ft. addition to Kraft Bag Corporation's converting plant at St. Marys, Georgia, scheduled to go "on stream" in February.

Here, in one giant integrated operation, logs from our own forest lands are turned into pulp, then into paper, and finally into heavy duty multiwall shipping sacks, using the most modern machinery and equipment the industry affords.

This expansion of our facilities is one more step in our constant efforts to provide our customers with the best in quality and service.

We invite your inquiries.



Paper Mill at St. Marys, Ga.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.

Daily News Building, Chicago 6, Ill.



Tailored to keep you ahead of the high-analysis trend

SOHIOGEN[®] SOLUTIONS

READY SUPPLY TO MEET YOUR NEEDS



READY SERVICE TO MEET YOUR SCHEDULES



With changes coming at a startling rate in the fertilizer business, just keeping up with them can be a problem. But Sohio keeps its customers ahead of the trend to high-analysis fertilizers by tailoring solutions to the times.

Sohio specialists who work with you match your requirements from a full line of SohioGen solutions and Sohio nitrogen materials — ammonia, ammonium nitrate, and urea — blended to a wide range of chemical and physical properties.

Technical help. The right material for your job. Johnny-on-the-spot delivery. All add up to fewer problems and lower production costs at your end of the line. Ask your "Man from Sohio" for the full story.

You get these extra advantages when you deal with Sohio:

- Higher nitrogen content solutions (concentrated solutions containing less water).
- Higher fixed-to-free ratio solutions (solutions containing higher ratio of salts to ammonia).
- Development of new solutions to satisfy specific needs for higher fixed-to-free ratio solutions.
- Addition of urea to lower saturation temperatures (making it possible to use special solutions).
- Full technical assistance and service in using more solutions for production of fertilizers.
- Development of solutions adapted to preneutralization.



...we're serious about SERVICE at Sohio

SOHIO CHEMICAL COMPANY

FORT AMANDA RD., P.O. BOX 628 • LIMA, OHIO

Phone CApitol 5-8015 or wire (TWX call letters LIMA O 497-U)

10-60

**THERE
IS STILL
TIME TO
GET SET
FOR NEXT
SEASON'S
DEMAND**



OUR
PLANTS
PURR
LIKE
KITTENS

GRANULAR FERTILIZER by WEATHERLY

When the insistent new demand appears next season, *especially in the South*, it may be too late to get your plant ready. But if you start *now*, we can have you in production on time.

Weatherly Controlled Granulation is a system so well known by now that we need hardly tell you how much it has made Weatherly clients all over the US in the past 6 years since it was perfected and announced.

But you know, because *we guarantee production rate and product size*, that when we hand you the key you will have an operating plant, turning out granules uniformly through 6 and on 16 mesh screen, and at a rate of 20 to 60 tons per hour, as you choose.

Let's talk about it . . . *now!*

The D. M. WEATHERLY COMPANY
Industrial Engineers and Builders

80 Eleventh St., N.E., Atlanta, Georgia Phone: TRinity 5-7986

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President
ERNEST H. ABERNETHY

Editor and General Manager
CLAY W. PENICK, JR.

Associate Editor
BRUCE MORAN

Business Manager
V. T. CRENSHAW

Chicago Sales Manager
ELON A. ABERNETHY
1753 Howard St.—Room 200
Chicago 26, Illinois
Phone: Rogers Park 4-5616

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Commenting **F**reely

by BRUCE MORAN

Research is a word heard more and more often, and one that is being backed with more and more money all the time. Sometimes it is not clear to all what research really means. So it is interesting to read the definition made by the Daddy of pioneering research, the late "Doc" Kettering—inventor of the self-starter and many other automotive firsts:

"Research is a high-hat word that scares a lot of

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April, 1960

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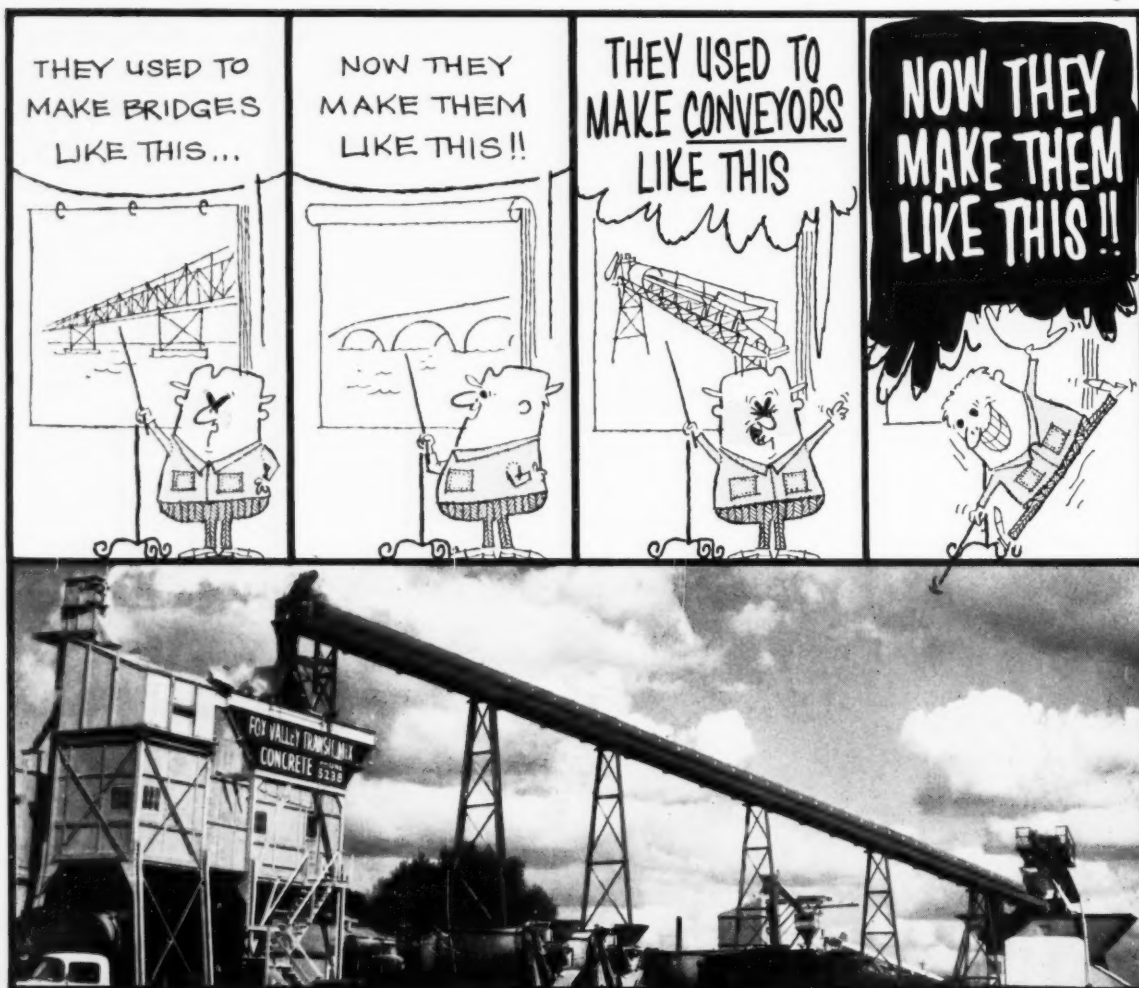
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people. It needn't. It is rather simple. Essentially, it is nothing but a state of mind—a friendly welcoming attitude towards change. Going out to look for a change instead of waiting for it to come. Research, for practical men, is an effort to do things better and not be caught asleep at the switch.

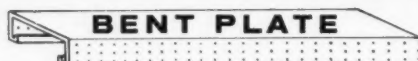
"The research state of mind can apply to anything: personal affairs or any kind of business, big or little. It is the problem solving mind as contrasted with the let-well-enough-alone mind. It is the composer mind instead of the fiddler mind. It is the 'tomorrow' mind instead of the 'yesterday' mind."



STEPHENS-ADAMSON

SECTIONAL BELT CONVEYOR

FEATURING



BENT PLATE

DECKING

The exclusive STEPHENS-ADAMSON Bent Plate Decking feature provides a new concept in simplicity in conveyor erection. Four high-strength bolts fasten head assembly — eight bolts join intermediate sections — and six bolts connect tail assembly — for simplest and easiest installation ever. Bent Plate Decking affords protection for return run of belt. S-A Sectional Belt Conveyors are competitively priced.

The STEPHENS-ADAMSON Sectional Belt Conveyor combines quality conveyor components and features provided in no other pre-engineered conveyor in the low cost field.

Find out today why the advantages of the STEPHENS-ADAMSON Sectional Belt Conveyor featuring Bent Plate Decking make other types of pre-engineered conveyors obsolete.



WRITE FOR
BULLETIN 458



AVAILABLE IN 18", 20", 24", 30" and 36" WIDTH CONVEYORS —
DELIVERED FROM STOCK

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 421 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO



Intensive customer service ...
part of the extra care* behind

SWIFT'S PHOSPHATES



*Extra care at Swift includes one of the most modern and reliable control systems in existence anywhere.

Swift's *extra care* is just as real as is the staff that provides it. Take Customer Service, for example. This is the department to call when you want information on cars shipped, car numbers, dates and routing. With the support of a modern, precise control system you get accurate up-to-the-minute information promptly. And this is just one part of the

whole Swift organization dedicated to providing better phosphate service.

Swift's extra care can help you even better satisfy your customers ... your plant operations ... and your profits. It's worth checking! Have a Swift Phosphate Center Representative outline the advantages Swift offers you in phosphates—Triple, rock or ground rock.

THE SERVICE CENTER FOR ALL YOUR PHOSPHATE NEEDS

SWIFT & COMPANY PHOSPHATE CENTER

.....Bartow, Florida.....

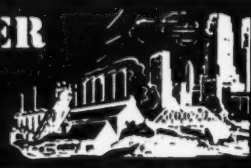


To Serve Your Industry Better WITH PHOSPHATE ROCK,
GROUND PHOSPHATE ROCK AND MINUTE MAN TRIPLE SUPERPHOSPHATE



JUST AROUND THE CORNER

By Vernon Mount



Dr. George D. Scarseth*, who is well known in agriculture, has said to the politician "Quit Needling Us". By this he means that every time we have complained about an economic pain "Dr. Sam" has given us a shot of inflation opium. He believes that the cure for this wide-spread illness is not more of the same, but a recognition that nobody is going to get something for nothing much longer.

Price supports for farmers, only 4.7% of our tax bill run to \$3,950,000,000. A small percentage, but a mighty dollar total.

The recovery will be painful, and many will not recover and will require special attention, Dr. Scarseth says, but the aches will be worth the cure.

Many farmers, he admits, do not agree with this, but he feels the nation should be grateful to those who do, and are willing to forsake the needle-cure and travel again the stony road to freedom which was pioneered by the farmers of the 13 original American colonies.

Dr. Scarseth has something there.

Yours faithfully,

* Director of Research, American Farm Research Assn.

Vernon Mount

MDCCCLXXXV




MCMLX

ANNO LXXXV



Imagination is the quality of choosing, and forcefully presenting, just those elements that emphasize your product, your selling message, your brand identity.

Imagination explains why, in our 75th year as in the other 74, the symbol  stands for always something new!

PERCY KENT RAG COMPANY, INC. KANSAS CITY • BUFFALO • NEW YORK



41 plants...for prompt delivery of AA quality products

41 plants of The A.A.C. Co., located in the United States, Cuba and Canada, assure you dependable, fast deliveries of AA quality products for farm and industry. You can schedule your production with confidence... the right quantity and grade will be at your plant when you need it.

*for uniform quality, prompt delivery
and technical service... order from*

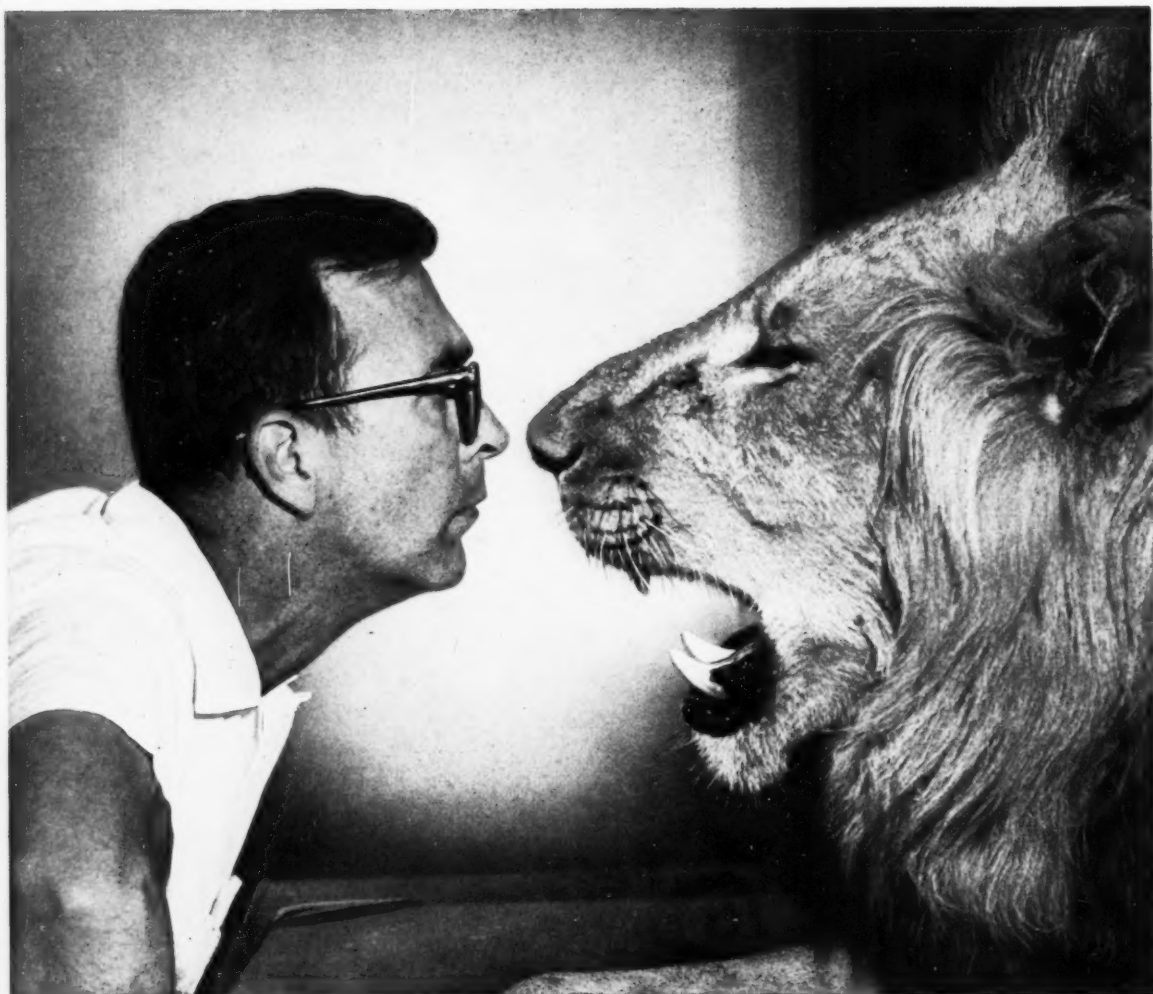
The
**American
Agricultural
Chemical**
Company

producers of:

Florida Pebble Phosphate Rock • Superphosphate
AA® QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers • Keystone® Gelatin
Bone Products • Fluosilicates • Ammonium Carbonate
Sulphuric Acid • Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus



GENERAL OFFICE: 100 Church Street, New York 7, N.Y.



Why you should take a close look at LION E-2*

You don't have to look this close to see the advantages of selling Lion E-2 Ammonium Nitrate. The first thing you'll notice is that Lion gives you a definite storage advantage because of its super-density. An 80-lb. bag of Lion E-2 is 20 to 25% smaller than an 80-lb. bag of any other brand. Thus, the storage space you save with Lion E-2 can be used for 20 to 25% larger inventories to make more profit.

You feel the second advantage when you pick up a bag of Lion E-2. The bags are coated with Syton®, a special Monsanto antislip agent that lets you and your customers get a better grip for faster, safer handling.

Lion E-2 gives your customers another big advantage, too. Because Lion E-2 is super-dense, farmers can load more in their spreaders . . . actually eliminate one out of every five refill stops! And, Lion E-2 is guaranteed at least 33.5% vital nitrogen for maximum yields.

If you want the "lion's share" of ammonium nitrate sales in your area, take a close look at Lion E-2. You'll like what you see! Want more information? Just roar! LION E-2, Monsanto Chemical Company, St. Louis 66, Mo. LION: Reg. T. M.; *E-2: T. M. Monsanto Chemical Co.



LION E-2 is the only ammonium nitrate on the market that can save 20 to 25% of your valuable storage space. Because each Lion E-2 prill contains less useless air, you can stack *five* 80-lb. bags of Lion E-2 in the same space previously taken up by just *four* 80-lb. bags of any other brand. (Lion E-2 is a good deal for your customers, too. Because of E-2's super-density, farmers can eliminate one out of every five refill stops.)

COMMERCIAL FERTILIZER



PRIMARY PRODUCERS OF FERTILIZER CHEMICALS

COPPER
SULFATE

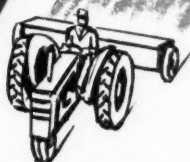
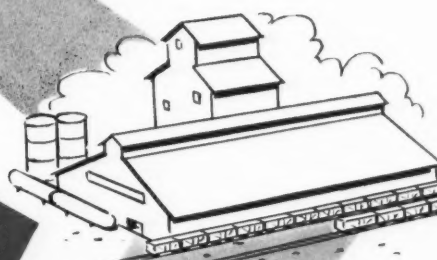
MANGANESE
SULFATE

ZINC
SULFATE

IRON
SULFATE

MANGANOUS
OXIDE

MINERAL
MIXTURES



For more than thirty years we have manufactured highest quality nutritional trace elements for application in fertilizers and maintained a consistent program of research to further improve the quality and performance of these products—Our basic position and background in this field assures you of a plentiful supply of highest quality materials.

Cut Costs with combined carloads from one basic source.

Cut Costs, save time, plant space and effort by using our custom formulated mineral mixture service—We will supply combinations of minerals mixed to your particular specifications.

Our Products are backed with service, research and technical assistance.

Foliar Nutritional Products Include—Iron, Zinc and Manganese Compounds—**NU-IRON, NU-Z, NU-MANESE and ES-MIN-EL** a foliar applied mineral mixture.

For samples or literature, make request on your firm's letterhead.



TENNESSEE CORPORATION
612-29 Grant Building Atlanta 3, Georgia



FUR-AG

the sterilized organic conditioner



Low cost Fur-Ag does so much for fertilizer quality it's used by leading manufacturers across the country. Fur-Ag reduces bag-set, helps keep goods free-flowing. It speeds up curing in the pile and provides bulk. Sterilized Fur-Ag is free from plant diseases, insects and weed seeds and it has a rich, natural dark color. Available all year 'round in bags or bulk. For full information, write for Bulletin 127.



The Quaker Oats Company
CHEMICALS DIVISION

345 The Merchandise Mart, Chicago 54, Illinois

A BASIC PRODUCER FROM MINE
TO FINISHED PRODUCT

SULFURIC ACID

QUALITY
RELIABILITY
ABUNDANCE
RAPID SERVICE
TECHNICAL
ASSISTANCE
VARIETY OF
GRADES AND
STRENGTHS

TENNESSEE CORPORATION,
The Southeast's Leading Sulfuric Acid Supplier

Our complete control of raw materials from mine to finished product allows our total independence from elemental sulfur and enables TENNESSEE CORPORATION to accommodate and ship large tonnages of acid quickly and with minimum notice.

The sulfur contained in the ore we process yields Virgin Sulfuric Acid of highest quality free from organic matter, very low in iron, and in no way contaminated from regenerated or spent sulfuric acid sources.

We produce all commercial grades and strengths of Sulfuric Acid from 60° Baume through the various Oleums.

We would welcome the opportunity to tell you our story—Call JACKSON 3-5024, Atlanta, Ga. or write



TENNESSEE CORPORATION
615 629 GRANT BLDG., TENNESSEE CORPORATION ATLANTA 3, GEORGIA



Long Life Promotional Ideas from OHIO THERMOMETER!



HERE ARE A FEW of scores of advertising thermometers, rain gages, and barometers manufactured by Ohio Thermometer. There are small thermometers and big ones—up to 39 inches... tube type thermometers and the dial type, too... thermometers for indoors—thermometers for outdoors... for wall or window. They are accurate, rust-resisting, and silk screened for long life. Re-distribution is easy, thanks to their individual packaging!

Yes, nothing beats a thermometer for stretching promotional dollars, as hundreds of blue chip advertisers know. Everyone is weather conscious—everyone is thermometer conscious. Ohio Thermometers tell the temperature and your advertising story at the same time!

Check into thermometer advertising. Colors and copy to your specification. Special sizes and designs obtainable. Drop shipments can be arranged. Write for details.

The OHIO THERMOMETER CO., 19 Walnut St., Springfield, Ohio. Please send me your thermometer selection kit.

Name _____

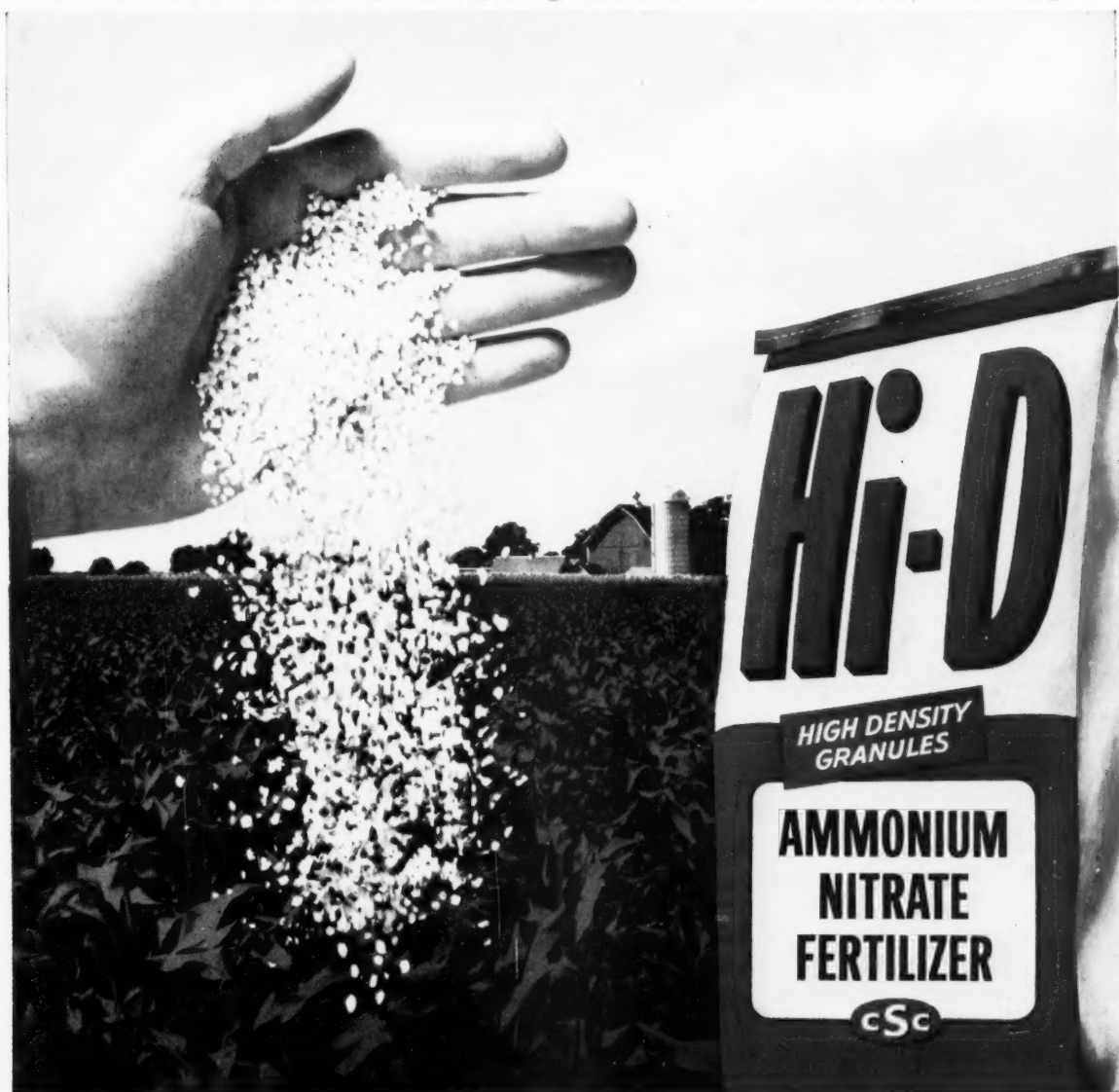
Firm _____

Address _____

City & State _____

THE OHIO THERMOMETER CO.
19 Walnut St., Springfield, Ohio

↓ During the fertilizer season, advertisements like this in full color are appearing in *Farm Journal*, *Farm & Ranch*, *Progressive Farmer*, and *Successful Farming*.



Keeps crops on the grow

it's the ammonium nitrate that's granular!

Corn, cotton, wheat, pastureland — whatever your crop, Hi-D® is the nitrogen fertilizer to use. You'll find it better than any ammonium nitrate you ever used before.

Hi-D always flows freely! Hi-D's special granules are unusually high in density and super dry, have much less tendency to pick up moisture prior to application. You will find it most satisfactory out in the field, even under humid conditions. Hi-D doesn't gum-up, won't clog, cake or bridge in your spreader.

Hi-D has a guaranteed analysis of 33.5% nitrogen. Half of this is nitrate nitrogen for vigorous early growth. The other half is ammonia nitrogen for sustained follow-up feeding. Your crops get the two types of nitrogen they do best on!

Let Hi-D keep your crops on the grow. It's sound management. But remember, first test your soil, lime if necessary and follow with the mixed fertilizer your dealer recommends. Then add the supplementary boost of Hi-D. Ask your dealer for it by name. Hi-D—best in the land!

COMMERCIAL SOLVENTS CORPORATION, AGRICULTURAL CHEMICALS DEPARTMENT, 260 MADISON AVENUE, NEW YORK 16, NEW YORK
OFFICES IN ATLANTA, CHICAGO, CINCINNATI, CLEVELAND, DETROIT, KANSAS CITY, NEW ORLEANS, ST. LOUIS, STERLINGTON, LA.



Just Say

DUVAL

That's All

and get both automatically

Continuing research and development assure you of consistently fine quality. Continuing recognition of the industry's need for dependable deliveries assures you of consistently fine service—same day shipment.

DUVAL

**MURIATE OF POTASH
SULPHUR**

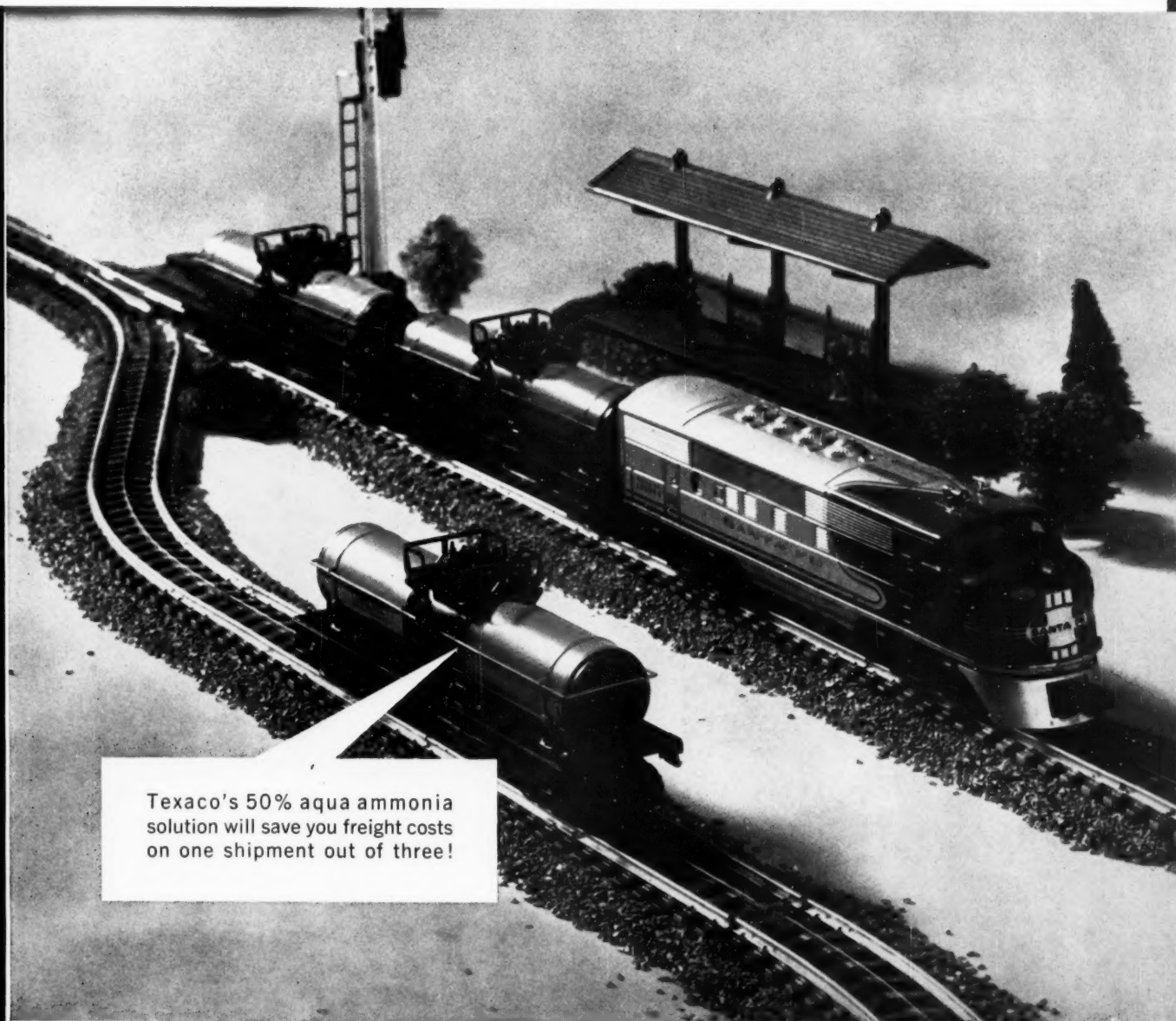
Produced by
**DUVAL SULPHUR
&
POTASH COMPANY**

Exclusive Sales Agent

ASHCRAFT-WILKINSON CO.

ATLANTA, GEORGIA

Norfolk, Va. • Charleston, S. C. • Tampa, Fla. • Jackson, Miss. • Columbus, Ohio • Montgomery, Ala. • Des Moines, Iowa



Texaco's 50% aqua ammonia solution will save you freight costs on one shipment out of three!

Don't pay freight on water when you buy ammonia!

When you buy Texaco's new 50% aqua ammonia solution instead of the standard 29.4% solution you get the equivalent of free freight charges on one shipment out of three!

Texaco's new 50% NH_3 solution gives you 57% more ammonia than the same volume of regular 29.4% solution. You save shipping costs on one tank car out of three.

When 50% solution arrives at your plant, you can dilute it to 29.4% without additional investment in handling equipment.

Only Texaco offers you this saving! For more information on this ammonia solution or any other high-quality Texaco petrochemical, call or write Texaco Inc., Petrochemical Sales Division, 332 South Michigan

Avenue, Chicago, Ill., or 135 East 42nd Street, New York 17, New York.

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV



TEXACO
PETROCHEMICALS

TEXACO PETROCHEMICALS: Aqua ammonia, anhydrous ammonia, nitrogen solutions, diisobutylene, odorless mineral spirits, naphthenic acid, propylene tetramer and rust inhibitors.

when you need



NITROGEN

use JOHN DEERE UREA NITROGEN . . .

***VITREA** 45% nitrogen from urea — all purpose, high quality nitrogen for direct application. Always free flowing.

***UREA** 46% nitrogen, prilled. Ideal for use in liquid or dry mixes.

***UREA-AMMONIA SOLUTIONS** The modern nitrogen for manufacturing liquid and dry fertilizers. Improves the physical properties of your mixed goods — non-corrosive to your equipment — safe to handle — resists leaching — suitable for either batch or continuous mixing.

***AMMONIA** Anhydrous ammonia . . . 82% nitrogen.

Send for free technical information.

PROMPT DELIVERIES! ORDER NOW!
write, wire or phone



Grand River Chemical Division of
DEERE & COMPANY

PRYOR, OKLAHOMA
TWX Pryor, Okla. 464 • Phone VA 5-2000

"Quality you know . . . a name you trust"

* VITREA * UREA
* UREA-AMMONIA
SOLUTIONS



In the world of bags... Burlap is king

Want *important* savings? Use burlap. You save on space, because burlap bags stack higher. You save on waste...burlap keeps breakage down. You save on handling costs...only burlap can take on 200 pound loads. You save on the bags themselves...burlap is re-usable. And another big plus...the farmer likes burlap. *He* asks for it. You should too.

THE BURLAP COUNCIL • 122 East 42nd Street, New York 17



SULPHUR

ONE OF THE FOUR
STRONG PILLARS
OF PROCESSING,

ONLY
2%

...BUT WHAT A

2% !



A recently compiled breakdown of Sulphur consumption in the United States, shows about 2% of the Sulphur goes into the manufacture of insecticides and fungicides.

Not much, perhaps, as tonnages go but no other use of Sulphur is more important with the possible exception of the 'wonder' drugs. It doesn't take much imagination to picture what would happen if the bugs and parasites were allowed to take over our crops and trees. Sulphur, along with other chemicals, is helping to protect our food supplies and foliage.

The role that TGS is playing in this constant fight against crop destruction is to see to it that the manufacturers of the insecticides and fungicides *always* have a ready supply of Sulphur, both solid and molten. This constant production and centralized distribution coupled with technical help is our contribution to industry.

SULPHUR PRODUCING UNITS

- Newgulf, Texas • Spindletop, Texas
- Moss Bluff, Texas • Fannett, Texas
- Worland, Wyoming
- Okotoks, Alberta, Canada



TEXAS GULF SULPHUR CO.

75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas



Arcadian[®] News

Volume 5

For Manufacturers of Mixed Fertilizers

Number 4

Sell More Tonnage NOW Sell ARCADIAN[®] Nitrogen

The rush season for mixed fertilizer sales will soon be over. But, there is still time to extend your season and sell more tonnage. Now is the time to aggressively sell ARCADIAN nitrogen materials (liquid and dry) for top-dressing and side-dressing.

Demand is Increasing

The market is there! Thousands of farmers in your sales territory will buy nitrogen for supplemental application this spring and summer. It will pay you to make sure that your mixed fertilizer customers buy their straight nitrogen from you. You can't help but benefit when your customers make you their headquarters for all their fertilizer needs.

You strengthen customer loyalty and you get a bigger share of the fertilizer market, when you supply all of the mixed goods analyses and straight materials your customers need and want. It pays to establish your prestige and your leadership as a dependable, one-stop, full-line source of supply.

You Benefit 5 Ways

Here are some of the benefits you get when you sell ARCADIAN nitrogen: 1) You increase your total sales and profits. 2) You help farmers to get better yields and insure that response to your mixed fertilizers will not be limited by lack of nitrogen. 3) You spread your overhead expense over a larger tonnage.

4) You keep your sales staff busy over a longer period.
5) You build farmers into exclusive customers for you and your dealers.

Nitrogen Division, Allied Chemical, manufactures and sells nitrogen for use in making mixed fertilizers and for direct application. Nitrogen Division has always fostered the role of nitrogen in a balanced fertilizer program and has spent millions of dollars to promote the use of mixed fertilizers. Nitrogen Division has also established ARCADIAN Nitrogen Products as the leading source of supplementary nitrogen for direct application.

Let Nitrogen Division Help You!

It will pay you to let Nitrogen Division work with you in helping you to offer your customers a complete line of mixed fertilizers and straight nitrogen materials. Many different ARCADIAN Nitrogen Solutions are available for the manufacture of every mixed fertilizer analysis now in demand. Many different ARCADIAN Nitrogen Products are also available to sell to farmers for direct application.

These products are powerfully promoted with the biggest nitrogen advertising campaign in history. For information about this campaign, see the following two pages. It will pay you to cash in on this campaign now! Extend your season and handle more tonnage, by selling ARCADIAN Nitrogen Products!



MORE RADIO

The ARCADIAN radio advertising campaign has been increased this year. More radio stations have been added and more time is being used on all stations.

MORE TV

Television stations in many farming areas are selling ARCADIAN with regular broadcasts which reach the farmer by eye and by ear several times each week. TV advertising gives extra impetus to sales.

BILLBOARDS

Large billboards, placed along well-traveled roads and highways in intensive fertilizer-consuming areas, display colorful posters during the fertilizer season, constantly reminding farmers of the profitable advantages of ARCADIAN Nitrogen Products.

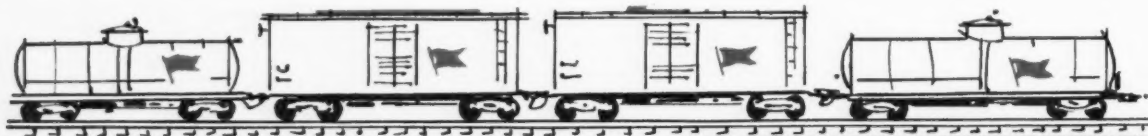
BIG, NEW PROFITS FAST-MOVING

Here's powerful advertising support for you—a big, expanded campaign to sell complete fertilizers and ARCADIAN® Nitrogen Products! Nitrogen Division, Allied Chemical is going all out this year to carry the ARCADIAN message to millions of farmers. All types of media that reach and influence farmers are being utilized—farm magazines, state farm papers, TV, radio, billboards, literature, exhibits, etc.

Much of this big, powerful campaign sells farmers on

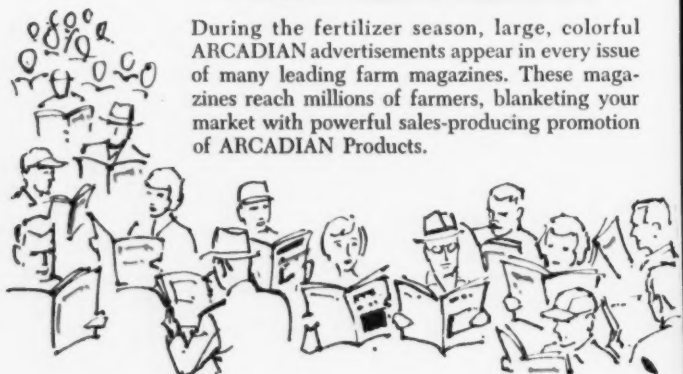
the importance of complete, balanced fertilizers. Most of the campaign is devoted to helping you sell modern, labor-saving, profit-building ARCADIAN Nitrogen materials—liquid and dry. More farmers are getting more education and more real sell this year than ever before.

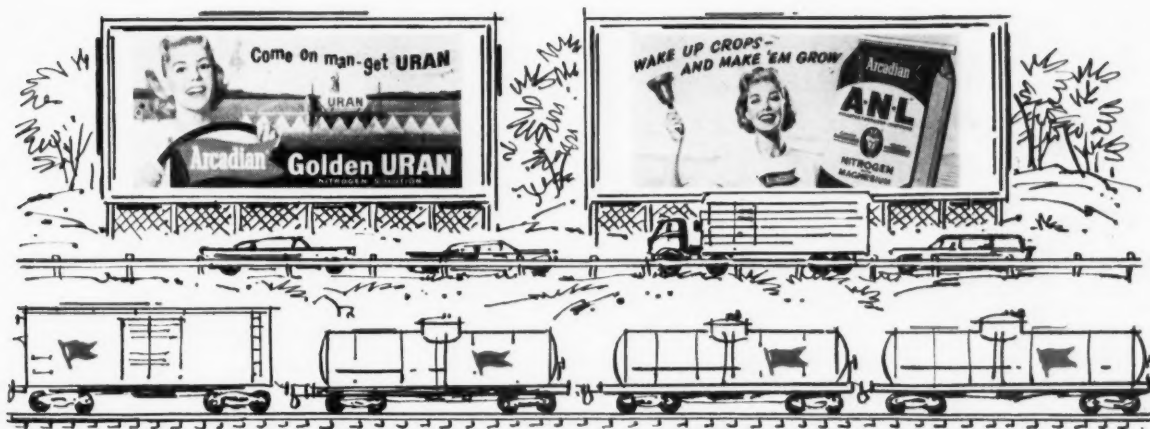
It will pay you to take full advantage of this campaign by stocking and featuring ARCADIAN products. It can mean more traffic through your dealers' stores—more tonnage and more profits for you.



FARM MAGAZINES

During the fertilizer season, large, colorful ARCADIAN advertisements appear in every issue of many leading farm magazines. These magazines reach millions of farmers, blanketing your market with powerful sales-producing promotion of ARCADIAN Products.





FOR YOU ON THE Arcadian® LINE!

The **ARCADIAN** trade-mark is as familiar as the face of an old and trusted friend to everybody who buys and uses fertilizers. It is the well-known symbol for high-quality, nitrogen products. The biggest and most powerful advertising campaign in nitrogen history is pre-selling millions of farmers, making it easier for you and your dealers to get orders. All this advertising effort is working for you, helping you move more tonnage, if you stock and sell **ARCADIAN**!

AMMONIUM NITRATE

A-N-L® NITROGEN

**Golden URAN®, NITRANA® and
FERAN® Nitrogen Solutions**

ANHYDROUS AMMONIA

AMERICAN NITRATE OF SODA

UREA 45



HERE'S THE BIG LINE OF



When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	-7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

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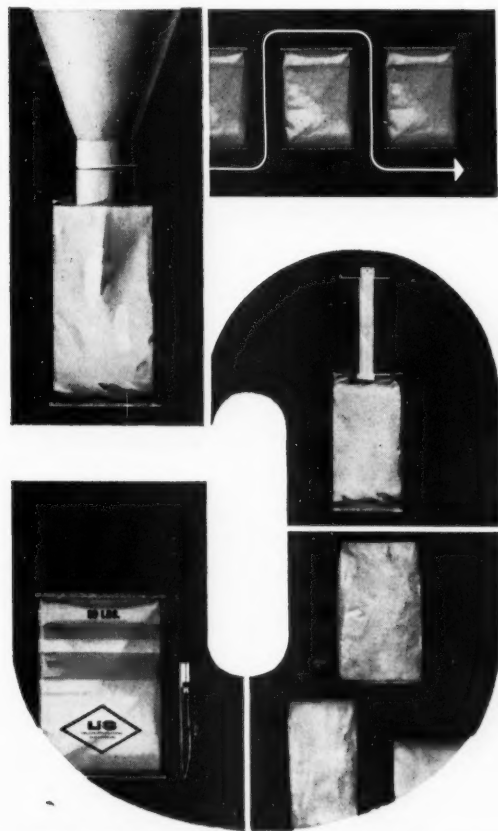
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Problems in Adding Secondary and Trace Elements and Pesticides to Liquid Fertilizers

by A. V. SLACK
Chemical Research Supervisor
Applied Research Branch
Division of Chemical Development
Tennessee Valley Authority
Wilson Dam, Alabama

In the past decade or so there has been a growing need for inclusion in fertilizers of materials other than the usual nitrogen, phosphate, and potash. There are several reasons for this. Fertilizers have been increased in grade to decrease handling and shipping costs, with the result that there is less room for the secondary and trace elements that formerly were included incidentally because they were present in the original raw materials. There have also developed needs in some areas, and for some crops, for specific minor elements in fairly large amounts, larger than would be supplied even by unpurified raw materials. Finally, improved farming practices have developed the need for adding such unrelated materials as pesticides to fertilizers.

The need for including additives in fertilizer has introduced several problems in production. In making solid mixes it is difficult to get good mixing of the small amount of additive with the other materials and, once mixed, segregation may take place in handling. Moreover, some additives may not be compatible chemically with the main constituents of the mixture.

In production of liquid fertilizer—nitrogen solutions and liquid mixes—the problem of incorporating the additive thoroughly is simplified but other problems may be increased, depending on the particular additive involved. If the additive is soluble in the liquid fertilizer, incor-

porating it is easily accomplished and the product usually is quite satisfactory. Unfortunately, many of the additive materials needed are not soluble and therefore considerable difficulty may be encountered in incorporating them satisfactorily.

Secondary Elements

Of the secondary elements, calcium and sulfur are the ones most often added to liquid fertilizers. Addition of calcium is restricted mainly to the Pacific States, where it is used in the form of calcium nitrate in ammonium nitrate solution. The solution produced there commercially contains 36.2 per cent calcium nitrate and 30.9 per cent ammonium nitrate, with a total of 17 per cent nitrogen (1). The calcium is claimed to have a soil conditioning effect specifically needed for some of the soils in the Pacific area. The solution is applied directly rather than mixed with other solutions.

Calcium is not compatible with liquid mixed fertilizer because it precipitates as the phosphate. There appears to be little need for adding it to mixed liquids, however, since in most cases direct application of lime from local sources should be more economical.

Sulfur is added both to nitrogen solutions and to liquid mixed fertilizer. Again, the practice is restricted almost entirely to the Pacific States. The sulfur is used in that area in two forms, as ammonium polysulfide and as ammonium bisulfite. The ammonium polysulfide, used mainly as an additive to anhydrous and aqua ammonia, con-

tains 20.5 per cent nitrogen and 45 per cent sulfur (8). It is a dark red liquid and is relatively noncorrosive unless allowed to oxidize by exposure to air. Tests have shown that it oxidizes to the sulfate at an adequate rate after application to the soil; 30 pounds of sulfur per acre oxidized in less than a week at 45° F.

Ammonium polysulfide is quite compatible with anhydrous or aqua ammonia, but it is not soluble to any useful extent in mixed liquids containing phosphate. It is also incompatible with herbicides but will mix with insecticides such as Aldrin.

Ammonium bisulfite solution used in the West contains 8.5 per cent nitrogen and 17 per cent sulfur (6). The main constituent is ammonium bisulfite but there are small amounts of ammonium sulfite and ammonium sulfate and traces of elemental sulfur. A pale yellow solution, it is made by absorbing byproduct sulfur dioxide from smelter plants in aqua ammonia. The pH is 5.2 and the solution can be stored in either mild steel or aluminum.

The bisulfite solution can be mixed with any of the fertilizer solutions. Typical grades with ammonium nitrate solution are 18-0-0-2 and 14-0-0-7. With mixed liquids, grades such as 10-10-0-3, 8-8-0-8, and 15-5-0-1 are reported.

In work at TVA, the solubility of ammonium bisulfite solution in liquid mixes made from superphosphoric acid has been determined. Grades such as 10-30-0-3 and 10-26-0-5 were prepared.

Ammonium sulfate and ammon-

This paper is based on material prepared for presentation at the Southern Regional Liquid Fertilizer Conference February 9.

ium sulfite may also be used to supply sulfur in liquid mixed fertilizers but they are less soluble than ammonium bisulfite. For example, although in the tests noted above a 10-26-0-5 could be prepared from bisulfite, the corresponding products with sulfate and sulfite were 10-23-0-3.3 and 10-24-0-3.6, respectively.

Little magnesium appears to have been used in liquid fertilizers. Like calcium, it precipitates as the phosphate from neutral mixes containing phosphate. The best method for incorporating magnesium and other insoluble materials in liquid products probably is the suspension technique. In this method a fine particle size of the insoluble material is used and a suspending agent or other means is employed to give a stable, nonsettling suspension. In work at TVA, a 3-9-9 suspension containing 3 units of MgO as dolomite has been prepared. The suspension was stabilized with 1 per cent of attapulgite clay as a suspending agent and the dolomite was ground to less than 100 mesh in size. Very little settling occurred in storage for a week and the product could be pumped and sprayed without difficulty through a 5/64-inch nozzle.

The suspension technique offers promise as a means of solving several problems of liquid fertilizers—not only incorporation of insoluble nutrients but also reducing costs by using wet-process phosphoric acid and increasing grade by suspending nutrient salts in their saturated solutions. Research on the method is being carried out at TVA and by fertilizer producers with promising results. Probably the main drawback to rapid acceptance is that the small spray orifices on much existing application equipment may not be suitable for suspension fertilizers. However, hose pump applicators and large orifice nozzles such as the deflector spray head type should be suitable and many farmers and custom applicators are equipped with these. There may also be an educational problem in introducing suspensions; farmers in some areas have become accustomed to clear liquids and may not accept suspensions readily.

Trace Elements

Of the elements usually classified as trace elements, boron is the only one that has salts soluble in liquid mixed fertilizer containing phosphate. Borax (sodium tetraborate

decahydrate; 11.3% boron) is relatively inexpensive and is used often. A more soluble material available commercially is a mixture of sodium pentaborate and sodium tetraborate, containing 20.5 per cent boron. For example, 0.85 per cent boron as the borate mixture can be dissolved in 8-24-0 without raising the crystallization temperature (4); in tests with borax an addition corresponding to 0.28 per cent boron could be incorporated without raising the crystallization temperature but 0.57 per cent could not.

The other usual trace elements—iron, copper, manganese, and zinc—have little solubility in standard liquid mixed fertilizer containing phosphate. In tests at TVA, only 0.01 to 0.04 per cent of these elements (added as the sulfates) could be dissolved in a 9-9-9 liquid fertilizer at room temperature.

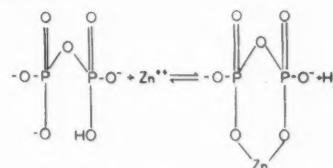
Two methods are available for incorporating these elements. One is the suspension technique mentioned previously and the other is use of an agent to complex the element and make it resistant to precipitation by the phosphate.

Sequestration: The complexing of an element to render it soluble in aqueous systems is called sequestration. Both organic and inorganic sequestering agents are available. The organic types, also known as chelating agents, have received considerable notice in recent years because of their ability to form trace element complexes stable enough to resist the tendency of certain soils to fix the element in an unavailable form. These complexes are soluble also in liquid mixed fertilizers.

The principal organic chelating agents are ethylenediaminetetraacetic acid and its salts. No published data appear to be available on the solubility in liquid mixed fertilizers of trace element complexes made with these compounds. However, it probably can be safely assumed that adequate amounts can be dissolved if enough chelating agent is used. The agents are relatively expensive, however, and may make the cost excessive in comparison to the metal sulfates normally used in solid fertilizers. Of course, if the liquid fertilizer is to be used on a soil which fixes trace elements severely, the cost of the chelate may be justified.

For general use, an inorganic sequestering agent such as a polyphosphate appears to be a better choice because of the relatively low cost. While the mechanism of metal complex formation with polyphosphates

is not well understood, it is probable that a chelating action is involved (2).



The sequestering action of superphosphoric acid has been studied in work at TVA. This acid (76% P₂O₅) contains part of its phosphate in the polyphosphate form, 42 per cent as pyrophosphoric acid and 9 per cent as higher poly acids; the remainder is orthophosphate. The polyphosphoric portion has been found to be an effective sequestrant for metallic trace elements, with the exception of manganese. Solubility in 9-9-9 liquid fertilizer at room temperature was as follows (elements added as the sulfates).

Trace element	Solubility, wt. %
Iron (Fe ⁺⁺⁺)	0.56
Copper (Cu ⁺⁺)	0.53
Zinc (Zn ⁺⁺)	0.64
Manganese (Mn ⁺⁺)	0.07

It has been pointed out in the literature (9) that chelated complexes containing manganese are less stable than those containing zinc, iron, or copper. Thus the polyphosphates in superphosphoric acid apparently do not have a strong enough complexing effect to get much manganese in solution, probably because of the short chain lengths of the polyphosphates involved. In other tests at TVA, 1.04 per cent by weight of manganese (Mn⁺⁺) was found to be soluble in 11-33-0 solution made from the reaction product of ammonia and phosphorus pentoxide. The polyphosphates in the latter product probably were of longer chain length and therefore gave a more stable complex with the manganese. Unfortunately, the NH₃:P₂O₅ reaction product is not as economical to produce as superphosphoric acid and therefore may not become available as a commercial material.

Use of the sequestering effect of superphosphoric acid to incorporate iron, copper, or zinc in liquid fertilizers appears attractive. Aside from the sequestering effect, use of the superphosphoric acid is advantageous because it increases the grade of the product as compared with use of ordinary phosphoric acid. Thus the sequestering effect is an incidental advantage, without extra cost for a sequestering agent.

Incorporation of trace elements by



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sequestration has the advantages, in comparison with solid mixes, that good mixing can be obtained easily, and segregation cannot occur after mixing. Moreover, there are no undesirable reactions between the trace elements and other constituents of the fertilizer such as sometimes occur in solid mixes. One disadvantage is that the amount of trace element which can be dissolved may not give the amount per acre desired in some cases. Practice is so varied in regard to application rate that this disadvantage is difficult to evaluate.

Suspension: The suspension technique is especially applicable to the trace elements since they can be dissolved in the phosphoric acid before it is reacted with ammonia and will then precipitate in a finely divided, easily suspendable form during the neutralization. Exploratory tests of this method at TVA have shown promise. Trace element salts can also be suspended directly as described earlier under the discussion of secondary elements.

Small amounts of trace elements can be obtained incidentally by using wet-process rather than electric furnace phosphoric acid in formulating the liquid fertilizer. This is being done in several plants, mainly in the states along the eastern and Gulf coasts. Impurities present in the acid precipitate during the neutralization but remain suspended fairly well. The trace element content varies with the purity of the acid used; typical contents reported are 1.1 per cent iron (Fe^{+++}) and 0.1 per cent manganese (Mn^{++}). Only traces of zinc and copper are present (5). About 1.0 per cent sulfur is usually found also. The concentration of trace element in the final liquid fertilizer depends on how much the acid is diluted by the various other materials added. For example, the concentration in a 9-9-9 mixture would be about one-sixth that in the acid.

Pesticides

There has been a growing demand by farmers in recent years for mixtures of pesticides with fertilizers, especially for those pesticides useful in controlling soil insects. Addition of the pesticides to solid fertilizers has been found to be a very troublesome problem. Manufacturers complain of mixing difficulty, safety hazards, liability for damage from use of the product, and complications in state regulations.

Liquid fertilizer producers have had somewhat less trouble with the

pesticide problem. Although there were some initial difficulties, emulsifying agents were soon made available which give a stable, uniform emulsion of almost any toxicant in the various types of liquid fertilizers. The pesticides mainly used in this way are Aldrin, Heptachlor, BHC, Dieldrin, Endrin, and Nema-gon. Herbicides have also been used. The pesticide normally is added as a concentrated mixture of pesticide, solvent, and emulsifier (3). A wet-table powder has also been used with good results (7).

The general practice in the liquid fertilizer industry is to mix the pesticide concentrate with the fertilizer in delivery or field equipment rather than in plant mixing units. The concentrate is usually added after the liquid fertilizer is loaded in the tank truck ready for delivery to the farm. Or it can be added to the applicator tank by the farmer. Since only slight agitation is required to form the emulsion, the shaking occurring during hauling is sufficient to give a uniform mix.

This procedure has some advantages over the plant mixing practice in the solid fertilizer industry. One of the major ones is that the type of pesticide and proportion between pesticide and fertilizer can be varied widely to suit specific farm conditions; if the mix is made at the plant, either flexibility is sacrificed or the manufacturer must make and store a variety of mixes.

Another advantage is that the pesticide is sold separately and added after the customer has bought the fertilizer. In most states this has avoided the problems of additional registrations for fertilizer-pesticide mixtures.

General advantages for pesticide-liquid fertilizer mixes are simplicity of mixing, better homogeneity of product, and reduction of the safety hazard in mixing.

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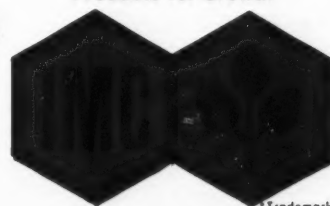
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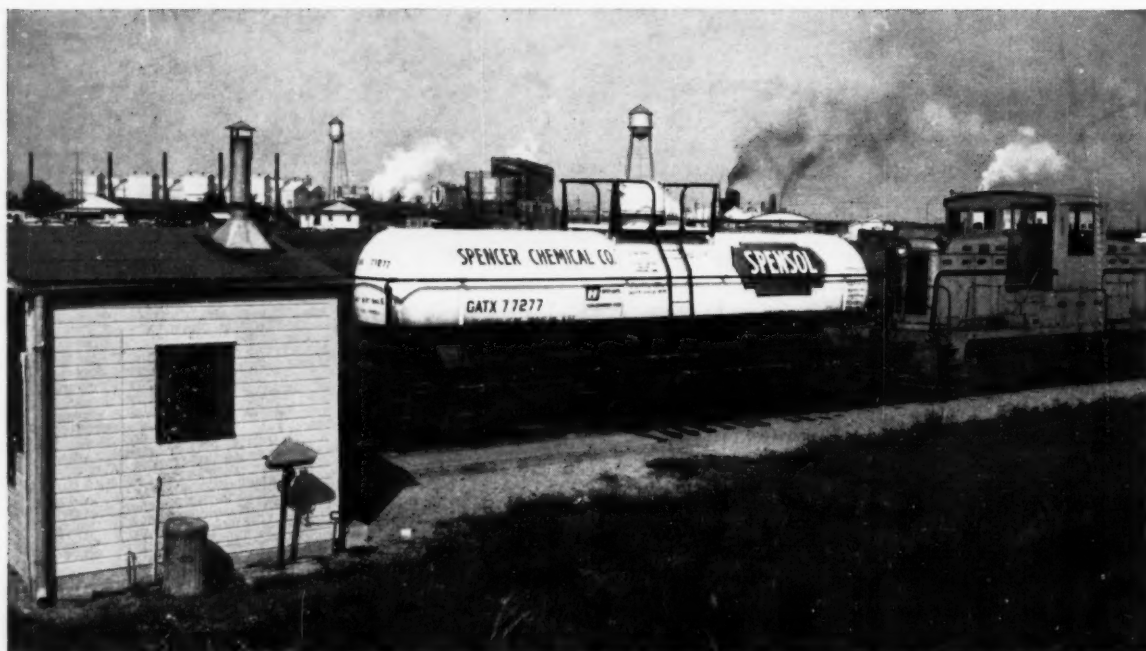


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Brand C	.300	2,630%
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Brand E	.234	2,030%
Brand F	.017	54.5%
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1959-60 SUPPLIES OF

FERTILIZER MATERIALS

THE FERTILIZER SITUATION, 1959-60
is a report of the Agricultural Chemicals Staff
HAROLD H. SHEPARD, in charge
JOHN N. MAHAN, fertilizer specialist
CHARLOTTE A. GRAHAM, administrative assistant
Commodity Stabilization Service
Food and Materials Requirements Division,
U. S. Department of Agriculture,
Washington 25, D. C.

Supplies of fertilizer materials are expected to total 8,085,000 tons of plant nutrients—nitrogen (N), phosphate (P_2O_5) and potash (K_2O)—for 1959-60. This tonnage is 5.2 percent higher than the unexpectedly large total of 7,685,000 tons which was available in 1958-59 when supplies proved to be 14 percent greater than in 1957-58.

Despite the increase in total supplies, such factors as the growing complexity of the industry, the need to provide the variety of materials demanded, and the increasing quantity of fertilizers that must be moved in a short period of time, may create apparent scarcities in the midst of plenty.

Transportation systems are limited in the quantity of fertilizers that can be moved in one day. Plants are limited in the quantity that can be manufactured or loaded on carriers, and because orders for a specific product cannot always be anticipated, stocks may become exhausted. Thus, spot orders, especially orders for anhydrous ammonia, nitrogen solutions, ammonium nitrate, concentrated superphosphate, and phosphoric acid, may go unfilled in some areas during the busiest part of the season. Needs for short items may be magnified when duplicate orders are placed with several producers.

Estimates of supplies for 1959-60 shown in this report are based on stock trends, rates of production, and foreign trade during the first six months of the fertilizer year.

Although 70 percent of sales are made in the last four months of the fertilizer year¹, from 40 to 55 percent of primary fertilizer materials are manufactured in the first six months. Production schedules are based largely on sales anticipated by primary producers and mixers as reflected by the attitude of dealers and farmers.

Rates of production during the first half of the 1959-60 fertilizer

year were above those last year and it is believed generally that they will continue so during the last half of the year. Primary producers were strongly optimistic toward mid-year. December production was the largest of any month in the history of the industry for each of the following: anhydrous ammonia, fertilizer grade ammonium nitrate solution, synthetic ammonium sulfate, nitric acid, urea and wet process phosphoric acid.

Inventories of primary producers, as well as those in other segments of the industry, were depleted last spring when sales exceeded expectations as gauged by production rates. Consequently, the accelerated production last summer was presumed to be for fall sales and rebuilding inventories. Stocks of primary producers at the end of December, however, were still below those a year earlier, except for anhydrous ammonia, nitrogen solutions and normal superphosphate.

Nitrogen (N)

Estimates indicate that supplies of nitrogen for fertilizers in 1959-60 will total 3,071,000 tons of N (table 1), an increase of approximately 11 percent over the previous record quantity for 1958-59.

Ammonium sulfate is in better supply than was anticipated earlier. Production was reduced less as a result of the steel strike than many feared and during the rest of the fertilizer year, it is expected to be at a high level. Producers of synthetic sulfate helped to bridge the gap. Also, exports have been somewhat lower and imports higher this year than last.

Production of fertilizer grade ammonium nitrate solution continues to climb—enough to provide increased supplies of solid ammonium nitrate, of ammonium nitrate solution, and of ammonium nitrate-limestone mixtures. The increase may be greater than is reflected in statistics on production because less of the quantity going to non-ferti-

lizer purposes is being classified as fertilizer grade ammonium nitrate.

Ammonium phosphate produced for shipment as such will reach a new high level in 1959-60.

Liquid nitrogen supplies will again reach a record level, rising to about 61 percent of the domestic supply of nitrogen. In every month from July through December, anhydrous ammonia production was at a record high for that month, and December production was the largest ever for any month. Production for July through December was 21 percent greater than in the same period last year. Indications are that anhydrous ammonia (including aqua) supplies for fertilizer use will be increased about 98,000 tons of N in 1959-60 and supplies of nitrogen solutions will rise even more.

Domestic production of urea is at a rate of about 35,000 tons of N ahead of last year. About 24,000

Table 1.—NITROGEN: estimated supply of nitrogen for fertilizer purposes, 1958-59 and 1959-60, United States and possessions
(1,000 short tons of N)

Item	1958-59 ¹	1959-60
Supply from domestic sources		
Solids:		
Ammonium nitrate ²	415	439
Ammonium sulfate ²	364	346
Urea	115	131
All other solids	208	238
Total solids	1,102	1,154
Liquids:		
Ammonia (including aqua)	827	925
All other	770	895
Total liquids	1,597	1,820
Total (solids and liquids)	2,699	2,974
Imports		
Ammonium nitrate	77	45
Ammonium sulfate	38	60
Urea ²	14	19
Ammonium nitrate-limestone mixtures	26	26
Sodium nitrate	72	76
All other	67	90
Total	294	316
Exports		
Ammonium nitrate	31	25
Ammonium sulfate	86	80
Urea	38	16
Ammonia (including aqua)	38	62
All other	30	36
	223	219
NET DOMESTIC SUPPLY	2,770	3,071

¹ Revised.

² Adjusted for estimated quantity going into non-fertilizer uses.

¹ The fertilizer year is from July 1 through June 30.

tons of this will be fertilizer grade, liquid and solid. Urea import data have been adjusted to allow for estimated quantities going into non-fertilizer uses. Exports are expected to be down to somewhat less than half those of last year. One domestic producer is reported to have withdrawn from the export market during the current fertilizer year.

Currently, 58 anhydrous ammonia plants are on stream with an estimated capacity of 4.1 million tons of N. Only two new plants have come into production during this fertilizer year. One other plant under construction may be on stream before June 30, 1960. Plans for the construction of two more plants were announced recently.

By-product ammonia capacity is estimated to have been 220,000 tons of N on January 1, 1960.

Fourteen urea plants are on stream with an estimated capacity of 840,000 tons of urea. Another plant, now under construction, will swell the total to 913,000 tons before the end of the fertilizer year. Plants now producing solid fertilizer grade ammonium nitrate in the United States number 19. Four domestic plants are now equipped to produce ammonium nitrate-limestone mixtures.

Phosphate (P_2O_5)

It is estimated that supplies of P_2O_5 for 1959-60 will total 2,761,000 tons (table 2), or 3.6 percent more than were available in 1958-59.

Normal and enriched superphosphate supplies will be smaller than they were last fertilizer year unless production is accelerated to fill P_2O_5 needs for less available concentrated products. Even though the supply of concentrated superphosphate is expected to be larger this year than last, this material is in tight supply and may be very short during the season's peak.

Ammonium phosphate supplies as such will be up about 63,000 tons of P_2O_5 .

Other phosphates will be up about 52,000 tons of P_2O_5 , principally as ammonium phosphate produced in combination with potassium salts and phosphoric acid for direct application and mixtures (liquid and solid). Imports of other phosphates are expected to be about two-thirds those of last year.

Phosphoric acid (wet and furnace) in 1958-59 totaled an estimated 138,000 tons of P_2O_5 , less than anticipated mid-way of last season. For 1959-60, the total is expected to be about 194,000 tons, a net increase

Table 2.—PHOSPHATE: estimated supply of P_2O_5 for fertilizer purposes, 1958-59 and 1959-60, United States and possessions
(1,000 short tons of available P_2O_5)

Item	1958-59 ¹	1959-60
Supply from domestic sources		
Normal and enriched superphosphate	1,400	1,346
Concentrated superphosphate	900	916
Ammonium phosphate ²	186	227
All other ³	318	378
Total	2,804	2,867
Imports		
Ammonium phosphate	42	69
All other	22	15
Total	64	84
Exports		
Normal superphosphate	36	29
Concentrated superphosphate	143	130
Ammonium phosphate	15	20
All other	10	11
Total	204	190
NET DOMESTIC SUPPLY	2,664	2,761

¹ Revised.

² Liquid and solid ammonium phosphate shipped as such by primary producers.

³ Includes ammonium phosphate (produced in combination with potash salts to make mixed fertilizers), nitric phosphates, sodium phosphate, wet base goods, calcium metaphosphate, natural organics, phosphate rock and colloidal phosphate, basic slag, and estimates of wet and furnace phosphoric acid for liquid and solid mixed fertilizers and direct application.

of 56,000 tons. Elemental phosphorus and furnace acid contributed in all forms an estimated 166,000 tons of P_2O_5 to fertilizer supplies last year. The total this year is expected to be about 171,000 tons. Furnace acid as such for fertilizer purposes is in tight supply and is expected to be very short during the spring rush.

Plants under construction and proposed projects may result in a sizable expansion of P_2O_5 capacity based on wet process acid. Several of the projects are to increase capacity and/or provide flexibility in operations which will enable producers to supply P_2O_5 in the form desired by the trade whether it be phosphoric acid, concentrated superphosphate, or ammonium phosphate.

Producers of elemental phosphorus are expanding facilities and one furnace acid plant is under construction. How much of the increased supply will be available for fertilizer purposes has not been indicated.

Potash (K_2O)

Deliveries during the first six months of the fertilizer year indicate that net domestic potash supplies in 1959-60 will total 2,253,000 tons of K_2O (table 3), about the same level as last year.

Graduated price discounts were in effect during the first six months, changing bi-monthly for potassium chloride (muriate) and quarterly for potassium sulfate. In each month just prior to the bi-monthly discount reduction (increase in price),

deliveries of muriate were about twice the movement in the previous month. However, total domestic deliveries in the first six months were at an annual rate about 38,000 tons of K_2O below 1958-59. Potassium sulfate deliveries were at a rate about 7,000 tons above that of last year.

Producers' inventories of potash are lower than they have been during the two previous years, and deliveries in the last six months will be more dependent on current production than in the past. Inventories at the end of the year will be even lower than at present if indicated deliveries for domestic use and export are maintained.

Potash imports have been greater than in the corresponding period a year ago. Even though East Germany announced last spring that it was withdrawing from the United States market, recent news items indicate that the Soviet Union is joining West Germany, France and Spain as a supplier of potash. The reported price of Soviet Union potash, which is lower than French or West German prices, appears attractive to East coast fertilizer manufacturers. The advantage of imported potash disappears rapidly farther inland. Exports are expected to be 60,000 tons of K_2O larger than those a year ago.

Estimated domestic production capacity is about 2,500,000 tons of K_2O . No new production came in during 1958-59 nor is any expected during 1959-60.

Production difficulties were encountered at the Canadian potash facilities. The plant which had started production is down and any production in Canada during the current fertilizer year is not likely.

Table 3.—POTASH: estimated supply of K_2O for fertilizer purposes, 1958-59 and 1959-60, United States and possessions
(1,000 short tons of K_2O)

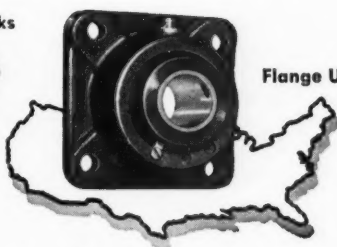
Item	1958-59 ¹	1959-60
Supply from domestic sources		
Potassium chloride	2,180	2,205
Potassium sulfate ²	123	127
All other	20	20
Total	2,323	2,352
Imports		
Potassium chloride	177	218
Potassium sulfate ²	37	35
All other	24	18
Total	238	271
Exports		
Potassium chloride	284	346
Potassium sulfate	17	14
All other	9	10
Total	310	370
NET DOMESTIC SUPPLY	2,251	2,253

¹ Revised.

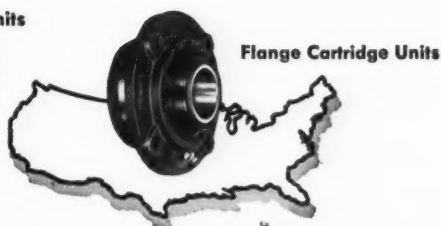
² Includes sulfate of potash-magnesia.



Pillow Blocks



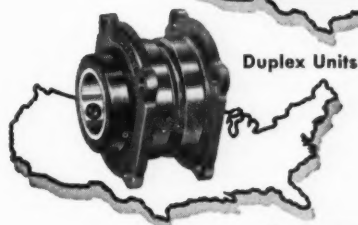
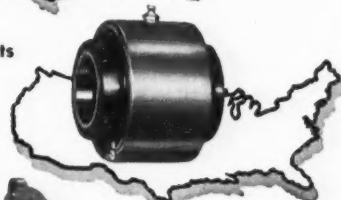
Flange Units



Flange Cartridge Units

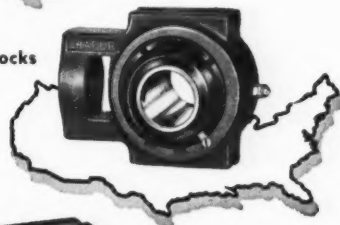


Cartridge Units

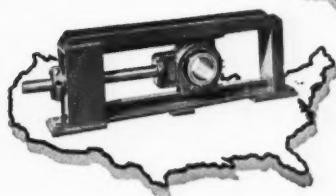


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ARIZONA

Southwestern Agrochemical Corp., Chandler, has resumed fertilizer production, interrupted by a shortage of phosphoric acid due to copper mine strikes, according to personnel director O. Andrezen.

CALIFORNIA

Collier Carbon and Chemical Corp. has awarded Leonard Construction Company of Chicago the contract for furnishing materials, engineering and design for a Leonard-Monsanto contact sulfuric acid plant to be constructed in the Los Angeles area.

The plant, which will have an initial rated production capacity of 250 tons of acid per day, will use spent alkylation acid, hydrogen sulfide and sulfur as raw materials.

The plant is designed specifically to meet the rigid air pollution regulations of the area, Leonard said, and one of its unusual features is the Brink mist eliminator which will be installed to control fume emission from the stack.

The plant is scheduled for completion by late 1960.

Instead of producing ammonium sulfate itself, as earlier planned, Collier will reportedly deliver acid and ammonia to Filtrol at Veronon for production and will then be the marketing agency for Filtrol-produced sulfate.

American Potash & Chemical Corp. will spend approximately \$25 million for capital improvements over the next three years, president Peter Colefax announced last month.

The program includes expansion of plants at Trona, California and Aberdeen, Mississippi.

Brea Brand Agricultural Service has completed and opened a new plant in Fresno for distribution of fertilizers and other agricultural requirements. Edwin E. Hughes, the owner and manager, says \$100,000 has been invested in modern equipment for application and storage for 200 tons of fertilizer.

FLORIDA

Virginia-Carolina has resumed production of elemental phosphorus at Nichols which has been closed since 1957. The production at Nichols will supply the two new plants V-C is building.

GEORGIA

Cotton Producers Association has



Around the Map

placed in operation their 40 ton per hour granulating plant at Cordele. Utilizing the Weatherly process for controlled-granulation, the plant will manufacture product size between six and sixteen mesh. The complete building and equipment were erected and placed in operation in five weeks. The D. M. Weatherly Company of Atlanta, Georgia designed and erected the plant.

IDAHO

San Francisco Chemical will reopen May 1 the Waterloo phosphate plant near Montpelier closed in 1958 and will start up the new open-pit mine 22 miles from there, according to R. K. Barcus, assistant general manager. The mill will go on 24-hour operation, seven days a week.

KANSAS

Cooperative Farm Chemicals \$1,250,000 nitric acid plant was put into service at Lawrence just six months after the contract was awarded to Chemical Construction Corp. New York. Chemico began the engineering work in June; construction began in August; successful test operation was conducted in early January; the plant was formally accepted on January 18.

Chemico has recently completed ammonia and urea plants there.

LOUISIANA

Dow Chemical has initiated a \$30,000,000 development of its division at Plaquemine, where a \$12,000,000 polyethylene plant is nearing completion. The new investment involves an ammonia plant, and other facilities which are due to be ready by early 1962. With this, Dow's Louisiana investment will total more than \$100,000,000, on top of its operations in Michigan and Texas.

Liquid Nitrogen Company, Inc., Crowley, has been granted dissolution of its charter of incorporation.

Freeport Sulphur's Grand Isle oper-

ation will give the concern the "greatest productive capacity" in its history, the annual report discloses. As our readers know it is located in 50 feet of water, and is the first offshore installation ever to be erected, sitting over one of the world's largest known sulphur deposits.

MICHIGAN

Klein Fertilizers, Fowlerville, expect to be in operation in time for the Spring season with their anhydrous ammonia installation in Shepherd.

MISSISSIPPI

Dixie Fertilizer Co., Meridian, is about to build a \$300,000 plant adjacent to the new Meridian sewage treatment plant, and will buy waste material from the municipality to make an organic-base specialty fertilizer. Construction will begin in 30 to 60 days.

Dixie Fertilizer is announced as "a newly formed organization," although the name and plan are the same as a similar operation proposed several years ago at Meridian.

MISSOURI

Armour Agricultural Chemical Company, Atlanta, Ga., has acquired the property and buildings for a new liquid-bulk blend fertilizer plant four miles west of Centralia, according to W. E. Shelburne, president.

The plant, which will supply bulk blend mixed fertilizer, complete liquid mixed fertilizer and liquid nitrogen material, will be put into operation in the late spring of this year, Mr. Shelburne said. Armour bagged fertilizers will also be sold at the new plant.

This new plant will be the first of its kind operated by Armour, which has 32 plants throughout the United States and in Cuba and Puerto Rico.

OHIO

Nitrogen Division, Allied Chemical Corporation, has announced expansion of capacity in two industrial

chemicals, methanol and formaldehyde, at its South Point plant.

Methanol capacity will be increased by 50 per cent and formaldehyde by 35 per cent. Methanol is used in the production of formaldehyde and the expanded production of formaldehyde will provide greater production capacity of its urea-formaldehyde products.

SOUTH CAROLINA

Virginia-Carolina has had such good success with its chlorinated phosphate based Folex that the new plant at Charleston is planned now to be ready by August or September. This activity will help balance their agricultural products. Folex is a cotton defoliator.

TENNESSEE

Hooker Chemical is putting \$6,400,000 into a third phosphorus furnace at Columbia, which will add 20,000 annual tons to their capacity when completed late in 1961. The Columbia facilities now produce 45,000 annual tons, to which must be added the Niagara Falls installation which turns out 6,000 annual tons.

UTAH

San Francisco Chemical will start mid-month to build their phosphate concentration plant near Vernal. The first unit of a six-unit Harry Ratliff Concentrator should be ready for operation by mid-October, with a capacity of a million annual tons of acid-grade concentrate, according to D. L. King, president. Their claim contains the largest known Western continuous deposit of phosphate rock.

VIRGINIA

Virginia-Carolina has instituted a formal, non-contributory retirement plan for its 3400 employees, which will provide retirement allowances for all employees at 65 who have 15 years of service, or at 55 with 20 years of service. This is in addition to the stock purchase plan announced in February, and is the second major employee benefit instituted since Justin Potter took the helm at VC.

* * *

Harrell Associates who operate a liquid fertilizer plant in Norfolk County are planning to build another at Port Richmond, and will operate it as Old Dominion Grain and Fertilizer Corporation.

WASHINGTON

Calspray will be ready soon with its huge plant at Kennewick, and is making plans to dedicate it May 19. As our readers know, the operation is a multi-million investment and will produce a complete line of liquid and conventional fertilizers.

WEST VIRGINIA

General Dynamics is reported negotiating for the plant at Morgantown which was built for the government by DuPont, at a cost of \$65,000,000, and for a time operated by them. It was later leased to Olin Mathieson, and vacated in 1958, and an effort to sell it failed to produce bids.

If General Dynamics and General Services Administration get together, General Dynamics may invest as much as \$85,000,000 to revamp the plant built for production of ammonia, nitric acid, ammonium nitrate, methanol, formaldehyde and other products.

WISCONSIN

Teweles Seed Co., Milwaukee, has broadened its line so as to offer a complete series of branded, packaged goods for sale to supermarkets, chain drugstores and variety stores. Fred Golan, formerly with O. M. Scott is now vice-president in charge of the specialty goods division.

WYOMING

Susquehanna-Western rushed completion of its Riverton sulphuric plant to satisfy increasing demand developed by new ore-processing mills opening up in their area. However a good share of their now 75,000 annual tons go to fertilizer. Their first plant was built at Riverton early in 1959.

ARUBA

The Aruba Exploration and Mining Co. Ltd. has been established by the island's government to develop mineral resources, especially phosphate. Test drilling contract has been awarded E. J. Longyear Co., Minneapolis.

ARGENTINA

Fish International, Continental Oil, Cities Service and Witco Chemical are planning a \$60,000,000 plant north of Buenos Aires to produce fertilizers and other products from chemicals derived from natural gas which will be piped from Campo

Duran and the southern Bolivian petroleum fields.

CANADA

Border Chemical expects to be in production by June with the sulphuric acid plant in Transcona. Concentrates will be shipped from Bird River, 100 miles northeast of Winnipeg.

* * *

Potash Company of America Limited has engaged Cementation Co. (Canada) Ltd. to proceed with a grouting program throughout all sections of its mine shaft located near Saskatoon, Saskatchewan. The details of the project are now being developed by Cementation and envision a systematic and coordinated withdrawal of the refrigeration. It is estimated a year will be required to complete this work at a cost of approximately \$900,000.

As a result of this decision, PCA will suspend all activities related to an early resumption of operations and arrange to do the work necessary to protect the facility for the period required to finish this project.

Since early November Cementation Company has been doing work in the Saskatoon shaft and were successful in greatly reducing the flow of water.

ENGLAND

Imperial Chemical Industries has instituted a thoroughly planned new approach to the amateur gardener. Research has shown he is confused by the multiplicity of products offered, and ICI plans to correct that with a simplified line.

The first product under this policy was announced in February, and is called "Plus"—one fertiliser for all crops and flowers. The plan is for one spray for all insects, one fungicide for all diseases and so on.

Ed. Note: There is an angle here for American producers: fewer items, smaller inventory for dealers; fewer items, lower production cost; fewer items—better profit for everybody.

INDIA

East Indian Distilleries have commissioned Simon-Carves to build the plant at Ennore, near Madras, which is expected to run to some 51,000 annual tons and to cost some three million pounds. In addition to the compound fertiliser plant, there will be facilities for ammonia, sulphuric acid and phosphoric acid. Production within two years is anticipated.

IRELAND

Imperial Chemical Industries and H. M. Goulding Ltd. have joined forces for the production of fertilizers in Northern Ireland. ICI will acquire from Goulding a 51% holding in Richardsons Chemical Manure Co., and Ulster Manure Co.

ISREAL

Dead Sea Works is planning an increase in potash production to 500,000 annual tons, the new output being intended for markets in Africa and Asia. The prospect looks excellent as the result of nearly completed preliminary tests for the exploitation of the recently discovered phosphate deposits at Ein Yahav, which run to a higher grade than that of Oran.

KOREA

Choongjoo, which has had a record of hard-luck delays, is finally in production. Last month the 85,000 annual ton urea plant turned out its first "snow-white" product, which contained less than the world standard maximum 1% of impurities... 0.95% to be precise. Full dress operation of the \$40,000,000 plant is expected this month.

MEXICO

Texas Gulf Sulphur has been permitted to terminate its labor contract and suspend its Mexican operations at Nopalapa Dome, which went into action first in 1957. Because of overcapacity in the industry and the fact that the Mexican operation is higher in operating cost than US mines, the concern can supply its customers better from US sources. Their equipment is mounted on barges, but no word has come as to the disposition of this. The mine itself is owned by the Mexican government.

PAKISTAN

Fenchuganji Fertiliser Factory, Dacca, is now expected to start trial operation in one unit by the middle of next year. The success of personnel training at Multan Fertiliser Factory has caused the PIDC director to ask the Japanese experts to train local personnel into skilled hands.

USDA says the US is the largest importer of agricultural commodities—our imports accounting to a sixth of the world total. Plough deep and fertilize well!

Potash Deliveries Up in '59; Illinois Led in Tonnage

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii by the eight principal American producers and also the importers totaled 3,979,899 tons of salts containing an equivalent of 2,328,880 tons K_2O during 1959, according to the American Potash Institute. This was an increase of over 4% in salts and K_2O over the same period in 1958. Continental United States took 2,175,581 tons K_2O ; Canada, 96,411 tons; Cuba, 9,299 tons; Puerto Rico, 25,387 tons; and Hawaii, 22,202 tons K_2O . These figures include imports from Europe of 268,002 tons K_2O . Exports to other countries were 311,358 tons K_2O , an increase of 36%.

Potash for agricultural purposes accounted for 95% of deliveries. Muriate of potash continued to be by far the most popular material comprising 94% of agricultural potash. Of the muriate, standard grade was 1,472,621 tons K_2O , while granular muriate was 999,911 tons, an increase of less than 2% in the standard 18% in the granular grade over 1958. Sulphate of potash and sulphate of potash-magnesia accounted for 6% of agricultural deliveries.

Agricultural potash was delivered in 46 states and the District of Columbia. Illinois with over 200,000 tons K_2O was the leading state followed in order by Indiana, Ohio, and Georgia, each taking more than 150,000 tons K_2O during the year. Due to shipments across state lines, consumption does not necessarily correspond to deliveries within a state.

During the fourth quarter of 1959, deliveries for agricultural purposes were 615,801 tons K_2O in continental United States; 43,055 tons in Canada; 3,198 tons in Cuba; 6,998 tons in Puerto Rico; and 4,090 tons in Hawaii; making a total of 673,862 tons K_2O , an increase of 1% over last year. These figures include imports from Europe July thru December. Exports of potash to other countries during the fourth quarter were 106,379 tons K_2O , an increase of 59,284 tons, or 126% over last year.

In addition to the regular reported deliveries on the quarterly basis, information from governmental and

other sources indicates that during July thru December, 1959, there were imports of European potash into the United States, Canada, Cuba, and Puerto Rico of 129,344 tons K_2O as muriate of potash and 26,319 tons K_2O as sulphate of potash. These figures are included in the deliveries for the fourth quarter.

Monsanto to Make 'Superphosphoric' Acid

Monsanto Chemical Company's Inorganic Chemicals Division has begun construction of a plant to manufacture 105 per cent phosphoric acid. E. J. Bock, assistant division general manager, announced.

Erection of the plant at Addyston, Ohio (in the Cincinnati metropolitan area), will make Monsanto the nation's first commercial producer and shipper of bulk quantities of this concentrated acid, Bock said.

The product is 40 per cent more concentrated than normal 75 per cent acid. A. Q. Svoboda, product sales manager for the division, explained. The acid, transported in tank car and tank truck quantities, is easily handled at normal usage temperatures, and the high concentration results in both shipping and handling economies.

Called 'Phospholeum' by Monsanto, the acid is a natural desiccant, also an excellent sequestrant for many common trace minerals (such as calcium, aluminum and magnesium) which frequently interfere with liquid fertilizer processing.

The concentrated acid is less corrosive to metals than regular 75 per cent and 85 per cent acids. Although the concentrated acid can be readily diluted to regular acid strength, Monsanto also will manufacture both 75 per cent and 85 per cent acid at the new plant, which is scheduled to go on stream in early September, Mr. Svoboda said. Meanwhile, representative laboratory samples are available to industry. Location of the plant at Addyston, where Monsanto already has plastics manufacturing facilities, will extend the company's marketing area for phosphoric acid to areas which are not now phosphoric acid plants. Neither cost nor capacity of the new plant was announced.

'Essentially Anhydrous'

Ammoniating Solutions

Introduced to Industry

A new line of essentially anhydrous solutions of ammonia and ammonium nitrate has been introduced by Commercial Solvents Corporation. Production of the new solutions, marketed under the trade name 'DRI-SOL*', has just come onstream in a new processing unit at Commercial Solvents' Sterlington, Louisiana nitrogen plant.

Pilot-plant output of the Dri-Sol line last year yielded adequate quantities of the product for the manufacturer to field-test the new solutions in actual mixed fertilizer production under a variety of processing conditions and procedures for both conventional and granular fertilizers. From data obtained in the field, CSC reports the solutions to have an unusual combination of useful properties and performance characteristics.

Especially surprising is the fact that vapor pressures of the Dri-Sol solutions are generally only 10-15 pounds per square inch higher than those of conventional solutions having similar ratios of free ammonia nitrogen to total nitrogen, but containing approximately six percent water. Crystallizing points are at least 15° F. lower, although viscosities are almost identical, Commercial Solvents also reports, and storage and in-process handling are similar to those for conventional solutions.

Containing only one-half of one percent water, the solutions are claimed by CSC to offer several advantages in lowering manufacturing cost and improving quality of mixed fertilizers. Among the potential benefits cited are: decreased freight costs; better process control in continuous ammoniation; lower formulation costs; lower drying

costs, increased dryer capacity, or an end-product with lower moisture content; increased plant capacity; faster curing and quicker shipping of conventional fertilizers; and improved physical quality of both conventional and granular fertilizer.

Properties

Commercial Solvents representatives state that Dri-Sol solutions are available in grades ranging from 24% ammonia and 76% ammonium nitrate to equal parts by weight of ammonia and ammonium nitrate, all containing only about one-half percent water. Table 1 compares properties of four typical Dri-Sol solutions with four conventional nitrogen solutions with similar free-to-total nitrogen ratios. The first three conventional solutions contain approximately six percent water, and the fourth solution (with the highest ammonia content) contains 12.8% water and was selected for comparison because it is the only commercially available conventional solution with approximately equal weights of ammonia and ammonium nitrate.

In each pair of solutions the nearly anhydrous solution has a higher nitrogen content than the corresponding conventional solution, the manufacturer points out, because of elimination of virtually all the water. Dri-Sol vapor pressures at 60° F. are one to eight pounds higher than comparable solutions with six percent water content, except that Solution 585 shows about 40 pounds more pressure than the conventional solution with 12.8% water. Crystallizing points of all solutions except the first pair are below -30° F.; salting-out point of the Dri-Sol 26% ammonia content is -9° F., 35° below the comparable conventional solution.

Production men will be interested in Commercial Solvents' statement that the almost-anhydrous solutions at ambient temperatures lose no more ammonia than conventional solutions having the same fixed-to-free nitrogen ratios if accidentally vented to the atmosphere, nor do they have any greater tendency to crystallize. Pointing out that the usual precautions should be observed to prevent loss of ammonia vapor, CSC technicians admit that Dri-Sol solutions tend to solidify more readily than conventional solutions in a heated line that is leaking ammonia, since there is less residual water to dissolve the ammonium nitrate when extreme amounts of ammonia have been driven off. However, they clearly point out that, because of the lower crystallization points, there should rarely be any occasion to heat the lines carrying the nearly-anhydrous solutions, and recommend instead that the line be blown out on shut-down.

The table indicates rather small differences in the specific gravities of the Dri-Sol solutions and the conventional solutions with which they are compared. CSC's research and technical staff reports that viscosities are also quite similar, and says that rotameter tests with the essentially anhydrous solutions show that no corrections are necessary except for the small differences in specific gravity.

Corrosion tests, they say, indicate that the inhibited Dri-Sol solutions are "as much as 38% less corrosive to steel than inhibited conventional solutions," but caution that this improvement is not sufficient to warrant the use of steel equipment for handling or storage. Except for differences noted in the preceding paragraphs, Commercial Solvents reports that the proper practices for

* Patents pending.

unloading, storing, in-process handling, and safety precautions recommended for conventional solutions also apply to the Dri-Sol line.

Advantages Claimed

Expanding on the advantages cited previously, CSC calls attention to the specific details of each of the seven points of economy and product improvement.

Freight costs are lower since essentially all the water has been eliminated and freight is paid only on the ammonia and ammonium nitrate, the company points out. For example, at a freight cost of \$5.00 per ton, shipping cost of a conventional solution containing 44% nitrogen and six percent water amounts to \$11.36 per ton of N. CSC's traffic men cite, while one of the nearly anhydrous solutions with the same free-to-fixed nitrogen ratio has a nitrogen content of 47%, and thus a freight cost of \$10.68 per ton of N, some 68¢ less per ton of nitrogen than the six percent water solution. With a water content of 12% in the conventional solution, they calculate the savings would be twice as great.

Better process control is possible in continuous ammonia, it is claimed, especially when making granu-

lar fertilizers where it is highly important to maintain the proper amount of liquid phase. As the amount of liquid phase depends upon the type and quantity of soluble salts in the mix and upon the temperature and water content of the mix, CSC's technicians point out, all three of these factors are increased when a larger amount of conventional solution-nitrogen is added, to a point that the liquid phase is sometimes excessive. While recycling of dried product may be used to reduce this liquid phase and prevent 'mudding' in the ammoniator, this reduces the final-output production rate, they emphasize, while a reformulation to reduce the solution-nitrogen input usually increases raw material costs.

In Commercial Solvents' new virtually-anhydrous solutions the operator may find a new and effective method of controlling liquid phase without resorting to excessive recycle rates or to reformulation of the grade, the company states. Addition of small, controlled amounts of water to the moderately hotter, drier mix can maintain the optimum amount of liquid phase while keeping moisture content at a minimum, they contend, and the mix usually

contains appreciably less water than when a conventional solution is used. For example, a formulation using 300 pounds of solution with six percent water content puts 18 pounds of water into the ammoniator per ton of product, and each pound of water—since it dissolves large amounts of the soluble salts—adds several pounds of liquid phase. On the other hand, they point out that use of the nearly-anhydrous solution, along with varying but small amounts of water to the ammoniator, not only maintains optimum amount of liquid phase, but produces maximum percent of on-size granules. And these hot, hard, relatively dry granules facilitate drying, according to the CSC technicians, because there is less danger of the material sticking to the sides of the dryer, and temperature and retention time in the dryer are less critical.

Citing the potential advantage of lower formulation costs, Commercial Solvents states that the use of higher amounts of nitrogen from the new almost-water-free solutions can be accomplished without over-agglomeration, and that this not only reduces the amount of ammonium sulfate needed in the formula-

TABLE 1. Properties of Dri-Sol and Conventional Ammoniating Solutions Having Similar Ratios of Free Ammonia Nitrogen to Total Nitrogen.

Composition and Properties	Dri-Sol 471 (26-74-0)	Conventional 440 (24-70-0)	Dri-Sol 499 (32-68-0)	Conventional 471 (30-64-0)	Dri-Sol 518 (36-64-0)	Conventional 490 (34-60-0)	Dri-Sol 585 (50-50-0)	Conventional 506 (43-45-0)
Total Nitrogen, % by wt. ¹	47.1	44.0	49.9	47.1	51.8	49.0	58.5	50.6
Composition, % by wt.								
Free Ammonia ¹	26.0	23.8	32.0	30.0	36.0	34.0	50.0	42.6
Ammonium Nitrate ²	73.5	69.8	67.5	64.0	63.5	60.0	49.5	44.6
Water ³	0.5	6.4	0.5	6.0	0.5	6.0	0.5	12.8
Nitrogen, % by wt.								
Free Ammonia Nitrogen	21.38	19.57	26.32	24.67	29.61	27.96	41.12	35.04
Combined Ammonia Nitrogen	12.85	12.21	11.81	11.20	11.11	10.50	8.66	7.80
Total Ammonia Nitrogen	34.24	31.78	38.13	35.87	40.72	38.46	49.78	42.84
Nitrate Nitrogen	12.86	12.22	11.81	11.20	11.11	10.50	8.66	7.80
Ratio Free Ammonia Nitrogen to Total Nitrogen	1:2.202	1:2.248	1:1.897	1:1.909	1:1.751	1:1.753	1:1.421	1:1.444
Percent Free Ammonia Nitrogen of Total Nitrogen	45.39	44.48	52.70	52.38	57.12	57.06	70.36	69.25
Per Unit of Nitrogen								
Solution, lbs.	42.46	45.45	40.04	42.46	38.59	40.82	34.22	39.53
Free Ammonia, lbs.	11.04	10.82	12.81	12.74	13.89	13.88	17.11	16.84
Ammonium Nitrate, lbs.	31.21	31.72	27.03	27.17	24.50	24.49	16.94	17.63
Water, lbs.	0.21	2.91	0.20	2.55	0.20	2.45	0.17	5.06
Properties								
Approx. Sp. Gr. @ 60/60° F.	1.137	1.147	1.074	1.103	1.037	1.042	0.930	0.984
Lbs. per gal. @ 60° F.	9.47	9.55	8.94	9.19	8.64	8.68	7.75	8.20
Approx. vapor press. 60° F., Psig	2	1	12	5	19	11	64	24
Approx. vapor press. 104° F., Psig	31	18	50	27	63	50	144	72
Approx. Cryst. Pt., °F.	-9	26	←30	←30	←30	←30	←30	←30

(Numbered footnotes refer only to Dri-Sol solutions)

¹ ± 0.5%

² ± 1.2%

³ ± 0.3%

← (Less Than)

tion, but makes it possible to use more normal superphosphate and less triple superphosphate which almost always costs more.

Plant Tests

Describing formulation work, company representatives cite a plant test in a TVA-type continuous ammoniator making 16-20-0 with 12 units of nitrogen from Dri-Sol Solution 471 (26-74-0) (Formula 1). With the previously used nitrogen solution (Formula 2), only 10 units of solution nitrogen could be used. In addition, they state that use of Solution 471 permitted substitution of normal superphosphate for triple superphosphate for 2.9 units of P_2O_5 . The granules produced in Formulation 1 were reported to be extremely dry and uniform in size, and to remain in excellent condition through a long storage period.

A plant test on a 12-12-12 mix made with 11 units of nitrogen from Dri-Sol Solution 471 (26-74-0) was reported to have exhibited about the same amount of liquid phase as a mix with only 9 units of solution-nitrogen from conventional solution 440 (24-70-0). Dry ammonium sulfate supplied the remaining nitrogen in both cases. Calculations made by the CSC technical men indicate that in the mix made with Solution 471, the heat of reaction due to neutralizing the ammonia in the additional two units of solution-nitrogen amounts to 66,000 BTU per ton of mix. This would raise the ammoniator temperature 15-25° F. and evaporate 40 to 55 pounds more water. In the test, the decreased moisture content of the mix was stated to more than offset the larger amount of ammonium nitrate in the mix and the higher solubility of the salts at the moderately higher temperature.

In using Solution 471 (Formula 3), 7.15 units of P_2O_5 from normal superphosphate were used, while with the conventional nitrogen solution (Formula 4) only 6 units P_2O_5 could be obtained from normal superphosphate, with consequent materials cost differences as indicated in the table.

Commercial Solvents also claims that using the new essential anhydrous nitrogen solutions often makes it possible to obtain the advantages of 'preneutralization' without the expense and operating costs of a preneutralizer, which evaporates some of the water going into the mix as a part of the raw materials by reacting the nitrogen solution with acid before introducing it into

the ammoniator. This reduces the liquid phase and allows use of more nitrogen solution in making high-nitrogen grades. With the almost-anhydrous solutions, water normally put into the mix as part of the nitrogen solution is so sharply decreased that the liquid phase is reduced, and more than the normal amount of nitrogen solution can be used without preneutralization.

Plant trials have also demonstrated that when the nearly-anhydrous solutions are used the temperature of the mix is increased sufficiently enough to help eliminate the need for excess acid that is sometimes added for extra heat-of-reaction, according to CSC men who assisted in the field tests. However, they stress that it is important to remember that—as the amount of solution nitrogen in the mix is increased—uniform distribution of the acid and solution (and therefore good sparger design and maintenance) becomes more important.

In amplifying the claim of lower drying costs when using the nearly-anhydrous solutions, Commercial Solvents emphasizes that less water goes into the mix as part of the solution, and that more heat is created in the ammoniator with these formulations, therefore the ex-ammoniator product will be drier and hotter, leaving less work for the dryer to do, and reduced recycle also lightens the load on the dryer.

When the granular 12-12-12 described earlier is made with 9 units of nitrogen from a conventional solution (Formula 4), total water content of the mix is approximately 127.5 pounds, while Formula 3—utilizing 11 units of N from Solution 471—puts only 119.8 pounds of water into the mix, some eight pounds less than Formula 4. Heat of reaction in the mix with 11 units of Solution 471 nitrogen is calculated at 268,000 BTU per ton as compared with 202,000 BTU in Formula 4. Assuming heat capacities of both mixtures as 0.35 BTU/lb./°F., the am-

Table 2. Formulations of 16-20-0 and 12-12-12 Comparing Essentially Anhydrous with Conventional Nitrogen Solutions.

	Lb./Ton Product	Cost, \$/Ton* Product
FORMULA 1: 16-20-0 Using Dri-Sol Nitrogen Solution		
Dri-Sol Nitrogen Solution 471 (26-74-0)	509	17.55
Ammonium Sulfate	380	7.03
Normal Superphosphate	290	3.12
Triple Superphosphate	728	22.57
Sulfuric Acid	178	1.61
Total	2085	\$51.88
FORMULA 2: 16-20-0 Using Regular Nitrogen Solution		
Conventional Nitrogen Solution 440 (24-70-0)	455	14.78
Ammonium Sulfate	571	10.56
Triple Superphosphate	881	27.53
Sulfuric Acid	102	0.92
Total	2009	\$53.79
FORMULA 3: 12-12-12 Using Dri-Sol Nitrogen Solution		
Dri-Sol Nitrogen Solution 471 (26-74-0)	467	16.10
Ammonium Sulfate	98	1.81
Normal Superphosphate	715	7.69
Triple Superphosphate	217	6.73
Muriate of Potash	397	8.34
Sulfuric Acid	187	1.69
Total	2081	\$42.36
FORMULA 4: 12-12-12 Using Regular Nitrogen Solution		
Conventional Nitrogen Solution 440 (24-70-0)	409	13.29
Ammonium Sulfate	293	5.42
Normal Superphosphate	599	6.44
Triple Superphosphate	268	8.31
Muriate of Potash	397	8.34
Sulfuric Acid	121	1.10
Total	2087	\$42.90

* Using prices applicable in the general area of Dallas.

bient temperature is 77° F., and assuming one-third of the heat is lost, the heat developed in Formula 3 is calculated to be enough to raise the temperature of the mix to 212° F. and evaporate 70 pounds of water per ton. The product at ammoniator discharge would contain 2.4% water. The heat developed in Formula 4 is enough to raise the temperature of the mix to 212° F. and evaporate 46 pounds of water per ton of product, in which case the product coming from the ammoniator would contain 4.0% water.

In the 16-20-0 plant test with Solution 471 (Formula 1) mentioned earlier, the mix contained 2.8% water, exit ammoniator. With the dryer operated 25° F. below the normal dryer temperature the product, exit dryer, contained 2.1% water. 16-20-0 made at this plant with conventional solution (Formula 2) normally contains 3 to 3.5% water, exit dryer, according to the operator.

On these laboratory and plant experiences, Commercial Solvents has based the claim that use of the essentially-anhydrous solutions can allow the operator to decrease dryer operating temperatures with a resultant savings in fuel costs and/or to produce a product with a lower moisture content. In addition, the company maintains that a drier, harder particle coming from the ammoniator will have less tendency to soften and cake in the dryer, and will reduce the possibility of decomposition.

Since dryer capacity is often the limiting factor in production rate,

CSC technicians cite the possibility of increasing throughput while maintaining normal operating temperatures in the dryer when the nearly-anhydrous solutions are used in formulation. They also point out that throughput can be increased under these conditions when less recycle is required to control agglomeration in the ammoniator, and when more on-size granules result from better liquid phase control. Better process control can insure faster start-ups, too, they contend. In some cases with the production of pulverized fertilizers in batch ammoniators there are opportunities for increasing production capacity through the use of the essentially-anhydrous nitrogen solutions, the company claims. As an example they cite one mixer who had been making 4-12-12 using about 1.5 units of nitrogen from anhydrous ammonia and 2.5 units from a 440 (24-70-0) solution. In a plant test both materials were replaced with a high ammonia-content Dri-Sol Solution 575 (48-52-0), and the mixer claimed a saving of one minute per batch, increasing the production rate by 10 tons an hour, or 80 tons per shift. The mixer stated that his final product also had a lower moisture content, that increased production rates had more than offset additional formulation costs, and that he no longer found it necessary to stock and use anhydrous ammonia in addition to a nitrogen solution.

Other plant trials, as reported by Commercial Solvents, tend to indi-

cate that less curing time is required when the essentially-anhydrous nitrogen solutions are used in manufacture of pulverized fertilizers, due principally to the higher temperature and lower moisture content of the mixtures. With mixing temperature increased, the company states that reaction is more nearly complete when the fertilizer goes into the bin, so less curing is needed. They also report that the more complete reaction and the drier product can greatly reduce or even eliminate the need for rehandling or aerating the fertilizer during the curing period, and that the dryness of the product minimizes any tendency of the phosphate to revert at the moderately higher storage temperature.

In one plant trial, say CSC's technical personnel, a Dri-Sol solution was used to make a 4-10-7 that could be bagged and shipped the day after mixing, and they reported most of the product was shipped the same week it was made. In another plant trial they reported a pulverized 5-10-15 made with the new 'dry' solution and bagged ten days after mixing showed no bag-set or caking after 30 days storage in 15-bag-high test piles.

Commercial Solvents' research and technical service staffs state that the plant tests have borne out laboratory predictions fully, and that—with commercial production of the new 'dry' solutions underway—new field data will continue to substantiate the experience gained from these earlier plant tests.

A Second Look at USDA's Fertilizer Consumption Data

To those of our readers who carefully studied the preliminary 1958-59 fertilizer consumption data compiled by USDA's Walter Scholl and associates (and published in our February issue), the following information may be nothing new. But to those who might not have taken a close look at the entire report, these 'highlights' reveal some interesting trends. Perhaps you overlooked some of them yourself.

Consumption of primary plant nutrients—nitrogen, phosphate, and potash—rose 13.6 percent in the United States during the year ended June 30, 1959, according to a preliminary report of the U. S. Department of Agriculture. An increase of

11.7 percent in the tonnage of fertilizers used was recorded simultaneously.

The 7,396,000 tons of primary plant nutrients contained in the 25,143,000 tons of fertilizers used during the year was 884,000 tons more than the total of primary nutrients used during 1957-58. Tonnage of fertilizers used was 2,627,000 tons greater than the 1957-58 total.

Mixed fertilizers made up 63.3 percent of the total tonnage consumed, and it was the first year since 1952-53 that an increase was recorded in the use of mixtures. The total established a new peak in annual consumption of mixtures. Thirty-seven percent of the nitro-

gen, 79 percent of the phosphate, and 87 percent of the potash were applied as mixed fertilizers.

The largest increases in fertilizer consumption occurred where cotton and corn acreages were up sharply; the smallest increases where there was little change in planted acreage. Increases were reported in all but seven States. The largest increase came in the South Atlantic Region (Virginia, North Carolina, South Carolina, Georgia, Florida), the West North Central Region (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas), and the Pacific Region (Washington, Oregon, California). The smallest was in New England.

Consumption of nitrogen totaled 2,643,000 tons, an increase of 359,000 tons (15.7 percent); available phosphate totaled 2,576,000 tons, an increase of 283,000 (12.3 percent); and potash totaled 2,177,000 tons, an increase of 242,000 (12.5 percent).



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CHANGES

Delavan Names New Rep. for Latin America Area

Delavan Manufacturing Company, West Des Moines, Iowa has announced appointment of Marco T. Castano, Lemarco Agricultural Spraying and Machinery Company as manufacturer's representative in Central and South America, including Cuba, Puerto Rico, Haiti and the Dominican Republic.

Mr. Castano will handle Delavan's complete line of agricultural nozzles, accessories, and fittings furnished by Delavan.

Lemarco Agricultural Spraying and Machinery Company is located at 6046 Louisville Street, New Orleans 24, La.

Richardson Opens Houston Office; Brice District Mgr.

As part of a general enlargement of its representation in the Southwest, Richardson Scale Co. has announced the opening of a district office in Houston, Tex.

Designed to serve the increasing demands of customers in the area, the new office will be managed by Jerry Brice, who for many years has been familiar with Richardson automatic weighing and proportioning equipment, as an associate of the W. E. Brice Co.

The address of the new office is: Richardson Scale Co., 2425 West Holcombe, Houston 25, Texas (Telephone: MOhawk 5-3978).

St. Regis Moves Columbus Office

St. Regis Paper Company announces that the regional and district office of its Bag Division has moved from 17 North 4th Street, Columbus 15, Ohio, to 2256 East Main Street, Columbus 9, Ohio, as of February 29, 1960.

The new telephone number is BELmont 7-5471.

New Chemical Agency For Wisconsin Control

A laboratory division of the Wisconsin department of agriculture has been created in an effort to meet demands for testing new chemicals.

The state board of agriculture put Walter B. Griem state chemist and fertilizer control official, in charge

of the new division. It will supervise the agency's seed, feed, fertilizer, dairy, food and toxicology laboratories.

"We will obtain a co-ordinated effort," said Donald McDowell, department director, "in testing and analyzing the great number of chemicals now being used as weed and insect killers and growth inhibitors for both human and animal food."

U. S. Borax & Chemical Moves Atlanta Office

The Atlanta regional office of United States Borax & Chemical Corp. last month moved to larger quarters at 1627 Peachtree Street, N.E., Atlanta 9, Ga. The telephone is TRinity 6-7515.

Continental Conveyor Opens Memphis Warehouse

Continental Conveyor and Equipment Company is opening a warehouse in Memphis, Tennessee,



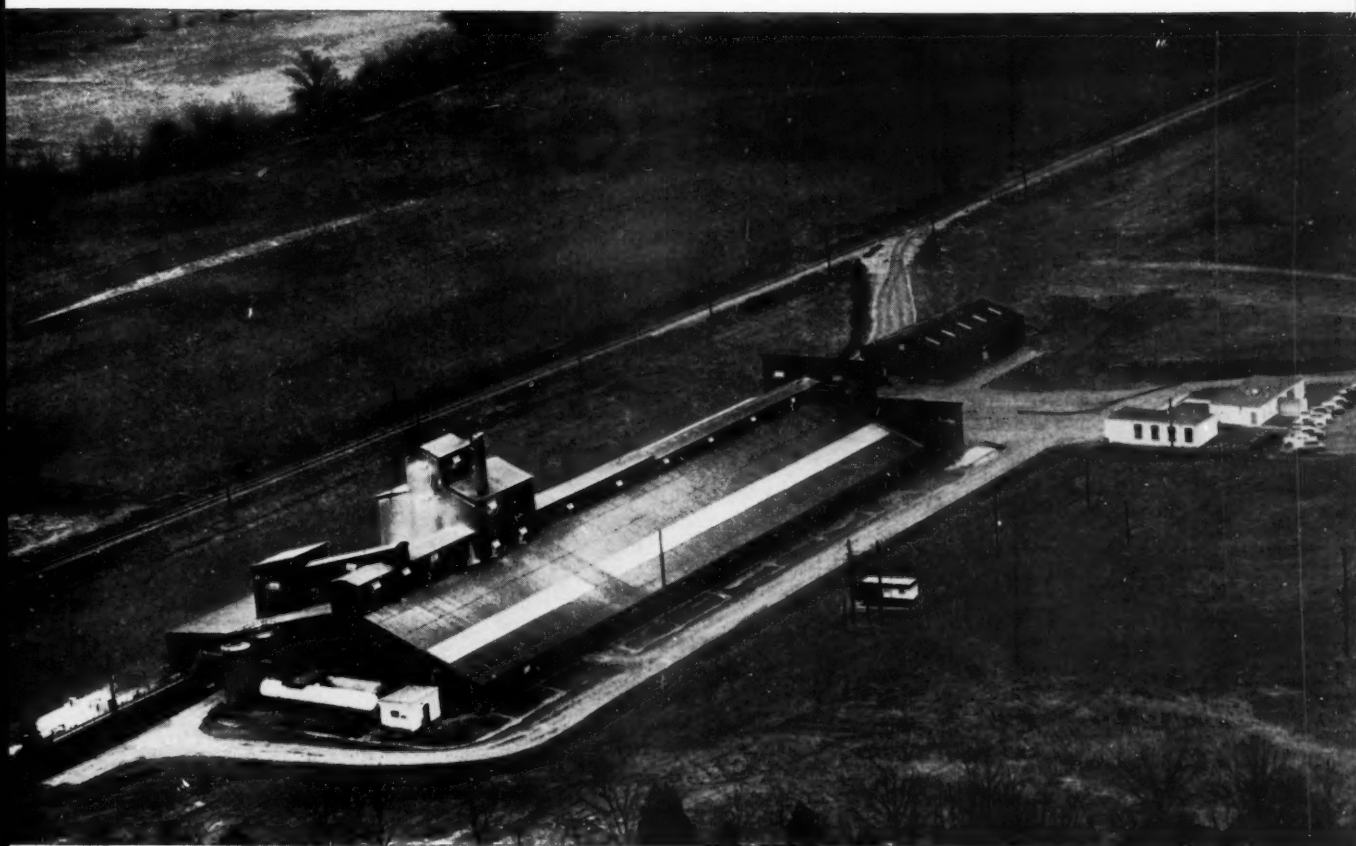
Helm

under the supervision of C. R. Helm, district manager, it was announced today by George R. Maples, Jr., president.

Mr. Helm has been located in Memphis since 1956, acting as sales engineer for Continental Conveyor's predecessor, the Industrial Division of Continental Gin Company. The new warehouse, located at 1722 Chelsea Avenue, will serve the Memphis and adjacent areas, making immediate shipments from a complete stock of Continental Conveyor products for elevating, conveying, materials handling, and power transmission equipment.

Seed Coating Beats Rainy Ohio Weather

A city man who went into the Ohio country to help farmers, J. Benton Jones, is experimenting with plastic or wax coating for corn seeds that will dissolve when the soil reaches a temperature suitable for germination. This is expected to permit Fall planting, and beat the rainy Spring weather which too often prevents timely planting.



A NEW PLANT FOR KENTUCKY . . . A NEW RECORD FOR SACKETT

Here's a brand new granular plant for Kentucky . . . and a remarkable new construction record for The Sackett Company.

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lizer manufacturing facility* was built by us in 6 short months.

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Nitrogen Division

William H. Van Beck has been appointed a vice president of Allied Chemical's Nitrogen Division, it was announced by Jacob White, division president.



Van Beck

Mr. Van Beck, who is also division comptroller, will assist the president on administrative and financial matters.

The new vice president started his career with Allied Chemical in 1931. He has been comptroller for Nitrogen Division since 1955.

Eugene L. Heintz has been appointed a sales representative for Allied Chemical's Nitrogen Division.



Heintz

A former county extension director in Muscatine County, Iowa, Mr. Heintz will cover the West Central Illinois sales territory.

He is a graduate of Iowa State University with a bachelor of science degree in agricultural education, and is a native of Nevada, Iowa.

Mid-South

Dr. H. Bradford, Jr., vice president and sales manager of Mid-South Chemical Corporation, has been elected a director of the Memphis-based corporation, according to an announcement by Ellis T. Woolfolk of Tunica, Miss., president.



Bradford

Mr. Bradford succeeds F. M. Simpson, who became president of Cities Service Oil Co.

Mr. Bradford has been sales manager of Mid-South Chemical Corporation since it was organized 12 years ago.

Miller Chemical-Fertilizer

At the annual meeting of Miller Chemical and Fertilizer Corp., Baltimore, Roger W. Cohill, who has been with them since 1947, and is vice-president and salesmanager, was elected to the board.

PEOPLE

in the Industry

Escambia

James A. Hunter has been named product sales manager-agricultural chemicals for Escambia Chemical Corporation.



Hunter

In this capacity, Mr. Hunter will be responsible for the sale of Escambia Chemical Corporation's nitrogen products, and in that connection will work with Ashcraft-Wilkinson Company, Atlanta, Georgia, the exclusive sales agents for Escambia's nitrogen products.

After graduating from the University of Richmond he became salesman for Armour Fertilizer Works. Since that time he has accumulated ten years experience in the fertilizer industry, including four years as manager of Master Chemical Corporation in North Carolina and two years as sales representative with National Potash Company, covering the northwestern United States and eastern Canada.

He comes to Escambia from the Texas Gulf Sulphur Company, where he was a member of their sales department.

Cyanamid

Richard G. Tousey has been appointed American Cyanamid herbicide and fungicide department product supervisor. He was transferred from their phosphates and nitrogen department.

Central Chemical

Robert B. Troxel has been appointed sales manager for the home and garden division of Central Chemical Corporation, Hagerstown, Md., manufacturer of fertilizers, insecticides and chemicals.



Troxel

The widely-experienced Troxel has been in fertilizer-chemical sales since World War II. Previously he served as botanist for the Commonwealth of Pennsylvania.

Sulphur Institute

Dr. Moyle S. Williams has been appointed chief economist of The Sulphur Institute, it was announced by Dr. Russell Coleman, president of the newly formed research organization. Dr. Williams, who was chief economist of the National Plant Food Institute, assumed his new position on March 16, and is located at the Institute's headquarters, 1725 K Street, N. W., Washington, D. C.



Tisdale



Williams

Dr. Williams will be in charge of economic research and development for the new Sulphur Institute, whose principal purpose is to expand world consumption of sulphur through research and education programs. He also will serve as economic advisor to the Institute staff, and will provide liaison between the Institute and professional organizations and institutions concerned with economic research in both the industrial and agricultural fields.

The Institute has also announced the appointment of Dr. Samuel L. Tisdale as its chief agronomist. Dr. Tisdale presently is Southeastern regional director for the National Plant Food Institute, and will leave that organization on May 1 to assume his new position.

Dr. Tisdale will be in charge of the Institute's program of research and education in connection with the use of sulphur for agricultural purposes.

B-I-F Industries

Lyndus E. Harper was elected a vice president of B-I-F Industries of Providence, R. I. at a recent meeting of the board of directors. He has been associated with B-I-F since 1944 when Omega Machine Co. became a part of B-I-F Industries, and retains his position as president of Omega in addition to his new duties.

U.S.I.

Clifford E. Oman has just been named assistant to the director of production at U. S. Industrial Chemicals Co., division of National Distillers and Chemical Corporation. In his new position he will report to Paul J. LaMarche, U.S.I. director of production. At the time of his appointment, Mr. Oman was Tuscola General Manager.



Oman



Smith

James R. Smith, plant manager, now assumes full responsibility for Tuscola plant operations.

Mr. Smith had been plant manager of U.S.I.'s Caustic-Chlorine plant at Huntsville, Alabama from 1951 until 1957. He also served as plant manager of U.S.I.'s Zirconium-Titanium metals plant and as a production manager in the New York headquarters before his transfer to Tuscola last year.

Union Bag-Camp

Union Bag-Camp Paper Corporation has announced the appointment of Lawrence G. Brown to the newly created post of director, research and development, for the company.



Brown

A graduate of the Massachusetts Institute of Technology, Mr. Brown has had extensive experience in staff engineering, research and development. Prior to joining the Union-Camp organization, he was associated with the Scott Paper Company and, most recently, the Nashua Corporation.

Cortez Chemical

Seymour Thomas has been named general manager of Cortez Chemical Co., recently organized subsidiary of Arizona Fertilizer & Chemical Co., Phoenix, according to Frank M. Feffer, Sr., president of both firms.

Office and plant of Cortez Chemical are in the Arizona Fertilizer Building, 734 East Southern Pacific Drive.

Armour

Marion C. Manderson has been appointed technical director, Nitrogen-Phosphate division of the Armour Agricultural Chemical Company, effective March 14, according to an announcement by R. L. James, vice-president of the firm, and general manager of its Nitrogen-Phosphate Division.



Manderson

Prior to his appointment with Armour, Mr. Manderson was associated with the Arthur D. Little Research firm in Cambridge, Massachusetts, for the past five years, specializing in technical economic studies in the chemical-process industries, the announcement said.

AP & CC

American Potash & Chemical Corporation has transferred Dean L. Browne from its Lindsay Chemical division in West Chicago, Ill., to the firm's Los Angeles Office it was announced by J. N. Hinyard, director of market development.

Mr. Browne, who was formerly market development representative for Lindsay division, has assumed the same responsibilities in the company's over-all market development program.

Frederic B. Adams, Jr., director of the Pierpont Morgan Library at New York since 1948, was elected a member of the American Potash & Chemical Corporation board of directors.

Delavan

At the directors meeting held February 24, the Delavan Manufacturing Company of West Des Moines, Iowa elected J. David Hopkins to the office of vice-president in charge of sales. Mr. Hopkins, who has been with Delavan since January



Hopkins

1959 as general sales manager holds a Bachelor of Engineering degree from Yale University and a Masters degree in Business Administration from Harvard. Prior to joining Delavan, Mr. Hopkins, was Southwest Regional Manager for General Electric Company.

US Phosphoric

U. S. Phosphoric Products, division Tennessee Corporation, Tampa, Florida, has announced the enlargement of its Technical Services, through the following appointments and changes.



Tatum



Shamp

H. B. Tatum has been named director of technical service and is now located in Tampa. He has been associated with U. S. Phosphoric since 1936 serving in production, maintenance, engineering, research, development, sales and technical service.

John A. Shamp, Technical Service Representative, is now living in Kansas City, Missouri. He has been with the Corporation for 17 years rendering service in Sales, Customer Service and Technical Service. His area consists of Kansas, Missouri, Nebraska, Arkansas, Texas and the southern parts of Iowa and Illinois.



Graf



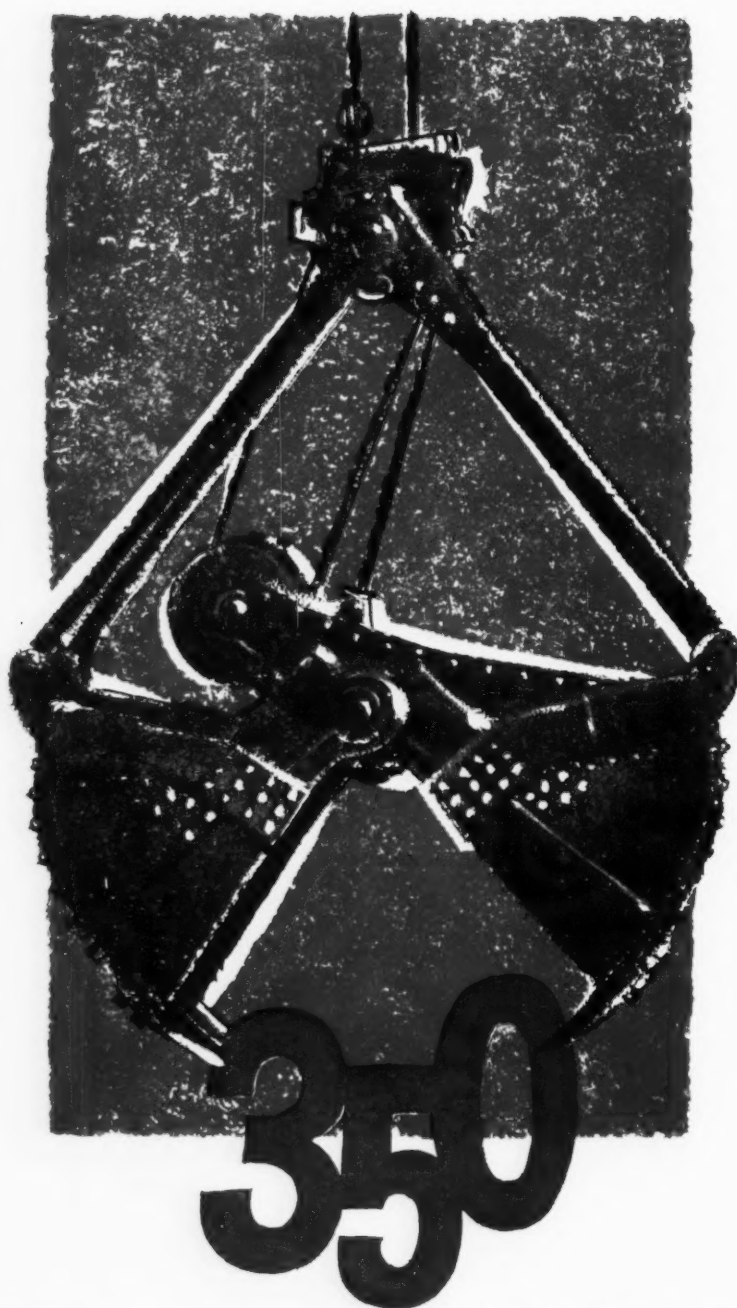
Hall

Robert D. Graf recently moved to Minneapolis from Tampa. His tenure with U. S. P. P. has been 8 years and his experience is in research, development, production, and technical service. Mr. Graf's territory consists of Minnesota, Wisconsin, North Dakota, South Dakota and the northern parts of Iowa and Illinois.

Robert L. Hall, technical service representative, came to U. S. P. P. from the University of Illinois. He is living in Richmond, Indiana, and servicing customers in Indiana, Ohio, Michigan and Kentucky.

Dorr-Oliver

Richard M. Sibley has joined the International Sales office of Dorr-Oliver Incorporated at Stamford, Connecticut. He has been with D-O



sizes and types make this the most complete line of Clamshell Buckets anywhere. Write for free illustrated

catalog. Blaw-Knox Equipment Division, Pittsburgh 38, Pa.

BLAW-KNOX
Clamshell Buckets

for four years, most recently serving as a sales engineer in the D-O Pittsburgh, Pa. office.

In his new position, Mr. Sibley will be responsible for sales of D-O products and services in Venezuela and the Caribbean area.

Emery Marton has been appointed director of the legal and patent department of Dorr-Oliver. He has been associated with D-O for the past seven years, most recently in the position of contract counsel.

Legal and patent functions were recently combined in a single organizational unit for more efficient service to D-O customers, suppliers and associated companies. Mr. Marton is the first director of the combined department.

US Borax

The board of directors of United States Borax & Chemical Corp. last month re-elected Frederick A. Lesser, chairman; James M. Gerstley, president; Hugo Riemer, executive vice president; J. Frederick Corkill, vice president, marketing department; Robert T. Edgar, vice president, production department; David V. Parker, vice president, 20 Mule Team Products Department; Norman C. Pearson, vice president; Richard F. Steel, vice president, Administrative Department, treasurer; Donald S. Taylor, vice president, Technical Department; Raymond C. Desta, assistant treasurer; Wesley A. Ackerman, secretary; John T. Cartledge, assistant secretary; and Gertrude B. Stiehler, assistant secretary.

Joe V. Kern has been named assistant to the resident manager of their potash mines and refinery at Carlsbad.

Dorvan C. Rolston has been appointed sales representative in the



Rolston

marketing department it is announced by L. Ralph Boynton, director of field sales operations.

Mr. Rolston, formerly associated with the nitrogen division of Armour Agricultural Chemical Company and the inorganic chemicals division of Monsanto Chemical Company, will represent U. S. Borax in Iowa, Minnesota, North Dakota, South Dakota and Wisconsin.

Working under supervision of the U. S. Borax Chicago regional office, Mr. Rolston will be based in Mason City, Ia.

Auburn

Dr. Walter F. Sowell has been named soils specialist of the Auburn University Extension Service.



Sowell

In making the announcement, director, Dr. E. T. York, Jr., said that Dr. Sowell's appointment is in line with the extension's educational efforts to help Alabama farmers overcome their number one production problem—low soil fertility.

Bemis Bro.

Arthur E. Schenck has been named sales service manager of the East Pepperell bag manufacturing plant, Bemis Bro. Bag Company, it was announced by W. I. Rodgers, manager.



Schenck

In making the announcement, Rodgers stated Schenck will be responsible for all sales activities and training within the East Pepperell delivery territory which includes the New England and East Central States.

Schenck, who joined Bemis in 1943 at the company's New York general sales department as a sales trainee, has served since 1953 as an executive general salesman in that division. From 1943 to 1949 he was a sales engineer and during 1949 to 1952, sugar bag sales specialist.

Florida AES

Dr. John W. Sites has been named associate director of the University of Florida Agricultural Experiment Stations, succeeding Dr. Roger W. Bledsoe, who died January 24.

Central Farmers

Changes in the managerial staff for Central Farmers Fertilizer Co., Georgetown, Idaho, according to acting manager Paul Carins, include:

James Colvin, new engineering and processing department head; Herbert Roubidoux, superintendent in charge of plant production, and L. Quiram, head purchasing agent.

Central Farmers has announced appointment of W. T. Tillotson of Chicago as general manager of the

(Continued on page 63)



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NEW YORK 20, NEW YORK



Overall view of bag closing machine. Bag has been filled (filling device not shown) and operator is forming top of the bag.

'Uniseal' Bag and Closer

Union Bag-Camp Paper Corporation will begin commercial production of its 'Uniseal' multiwall bags this month at the company's Savannah plant. Up until now, this completely heat sealed, liquid and airtight package has been made only on a pilot plant basis.

The Uniseal bag was first introduced ten months ago as an effective, economical solution to the problem of packaging hygroscopic, deliquescent, corrosive, semi-liquid or other hard-to-protect products. Designed to hold up to 100 pounds of bulk product, the bag is constructed in the form of a tube from two to six plies of paper. The inner ply is coated with polyethylene or other heat sealable materials. Depending on the protection needed for the product being packaged, the plies are made up of various combinations of kraft paper, kraft and foil or polyethylene-coated kraft and foil.

One unique feature about this new packaging development is that the outer plies of the bag are staggered or offset, leaving the inner ply exposed to take a direct heat seal application. Previously, it was impractical to heat seal the inner ply of a multiwall bag as the seal had to be made through all the paper plies. These plies provided an insulating barrier that prevented heat sealing at acceptable commercial speeds.

The vertical seam and the bottom of the inner ply are heat sealed by the bag manufacturer. The top of the inner ply is heat sealed by the bag user, after the bag is filled, with a special closing machine also developed by Union-Camp. After heat sealing the top of the inner ply, the closing machine applies adhesive to the tops of the outer plies. The entire lip is then folded over and pasted to the outside of the bag so that no pressure is exerted on the heat seal. Simultaneously, the machine adds a strip of 2½" width tape, centered over the edge of the lip. The customer closure effected by this special machine duplicates the factory closure on the bottom of the bag. The machine heat seals,

FREE LITERATURE ON EQUIPMENT MATERIALS AND SUPPLIES

pastes the lips and applies gummed tape at the rate of six filled bags a minute. Other models of this machine are now being designed to increase bag closing speeds.

Cuprous oxide and plastic molding resins are among the products now being shipped commercially in these bags. Molding and shipping tests are also being conducted for a number of other products, including caustic soda, ammonium nitrate, gelatin and monosodium glutamate.

In recent protective holding tests comparing Uniseal bags of different construction against three competitive rigid containers, all units were filled with calcium chloride and stored for the equivalent of six months of normal, uncontrolled storage. At the end of this period, the calcium chloride packaged in Uniseal bags showed no moisture pickup. By comparison, only the product packaged in the most expensive rigid container recorded no moisture pickup. The calcium chloride in each of the other two rigid containers gained small percentages of moisture.

In addition to substantial savings on container costs, the Uniseal bag also saves on shipping and storage space, and shipping costs are lower because of the difference in tare weight between multiwall bags and rigid containers.

For further information on Uniseal bags and closing equipment, circle number 1 on CF's Information Service Bureau card, page 51.

Panelcoil Bulletin

Panelcoil Technical Data Bulletin M-9 has just been issued by Dean Products, Inc. Examples are given showing heating and cooling of all types of tanks, troughs, mixers, and air duct systems. Also shown are applications where Dean Panelcoil has become part of the equipment itself.

This bulletin is available on request by circling number 2 on CF's Information Service Bureau card, page 51.



Liquid Dispensing Pump

General Scientific Equipment Company has announced a new polyethylene dispenser which pumps liquids from any standard 5-pt. reagent or 1 gal. bottle. A squeeze of the bulb starts the unit and a touch of the valve stops it, without a drip.

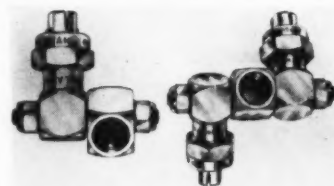
A safe and convenient method for removing small amounts from the container, the pump body is fitted with a syphon, a spout, and a 4-oz. squeeze bottle, and will deliver liquids at a rate up to 1000 ML per minute. Unit is priced at \$11.25 per package of three Pumps.

Complete information may be obtained in catalog H459 by circling number 3 on CF's Information Service Bureau card, page 51.

Boom Extension Sprayer

A new spray nozzle has been announced by Delavan Manufacturing Company. Identified as Delavan BX, these tips are designed to offer additional coverage for spray booms at flow rates consistent with standard boom nozzles. They are available from 5 GPA through 10 GPA.

Manufactured as both a single and double nozzle the Delavan BX offers additional coverage ranging



from 68" to 104" for single nozzles and from 153" to 194" for double nozzles when both are placed at 30" boom height.

The Delavan double BX nozzles are well suited for small broadcast sprayers. Nozzle coverage ranges from 153" to 214," and provide adjustments for good coverage under varying wind conditions or spraying situations. Tips are available in Brass or Aluminum, furnished with either Brass or Aluminum swivel nozzles.

For further information, circle number 4 on CF's Information Service Bureau card, page 51.

Magnetic Pulleys Catalog

Factors governing the selection of electromagnetic pulleys or non-electric ceramic type Perma-Pulleys are fully explained in Catalog C-2000 issued by Dings Magnetic Separator Company.

Dings new line of 'Ceramox V' Perma-Pulleys, with radial pole design, and the line of redesigned and improved Electromagnetic Pulleys, with new all-welded construction, are described and illustrated. A detailed chart shows how to select the proper magnetic pulley, either electric or non-electric, in relation to belt speed, belt width, and burden.

Catalog C-2000 is available upon request by circling number 5 on CF's Information Service Bureau card, page 51.

Automatic Nitrogen Analyzer

Just released is the New Automatic Nitrogen Analyzer designed and manufactured by Coleman Instruments, Inc., specialists in instruments for analytical chemistry. A fully-automated means of performing the time-tested micro-Dumas method, it is claimed to be excellent for numerous determinations presently made by the Kjeldahl process.

Within its 12 to 15-minute cycle, it performs a complete determination of nitrogen content. It will measure nitrogen in an almost unlimited variety of materials, including fertilizers and chemicals.

Operation is simple . . . and only one operator is necessary for con-



tinuous determinations. Nitrogen is gathered in a new type of nitrometer, and nitrogen volume is read directly in cc's from a digital counter. Only 18 inches of lab bench space are required for the instrument.

This new Coleman instrument achieves accuracy inherent in the micro-Dumas process, and eliminates individual analytical technique as a factor in the analysis.

The Coleman Automatic Nitrogen Analyzer is priced at \$2495 complete. Application information and product literature are available by circling number 6 on CF's Information Service card, page 51.

Portable pH Meter

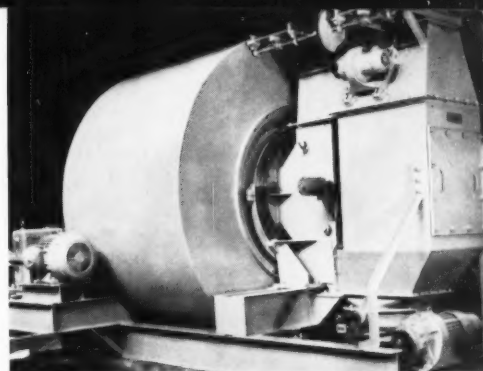
Analytical Measurements, Inc. announces a new concept in pH instrumentation—the Model 700 'Big Scale' pH Meter, making it simple to read pH values within .02 pH. Easily portable, it weighs but 5 lbs.



and can be used wherever a standard 115 volt AC outlet is available.

The Model 700 features a single operating control and a high output electronically modulated amplifier, with printed circuitry and sensitive meter elimination. The originally designed polyethylene electrode Probe Unit permits the user to 'bring the meter to the sample—not the sample to the meter,' enhancing the versatility and usefulness of this instrument, since it may be used to make pH readings anywhere on the production line and not confined to the laboratory.

For illustrated brochure No. 700, circle number 7 on CF's Information Service Bureau card, page 51.



Movable Blender and Hopper

A new, wholly-automatic Sturtevant rotary blender and hopper, on a movable bed, forms a processing bridge, blending materials as they come from other processes, introducing them directly into the next. A supplemental hopper holds other ingredients to be introduced into the next process, yet keeps them from intermixture with the blending materials until the appointed time.

Sturtevant Mill Company now makes such blenders available in capacities of from 500 lbs. to 20 tons. Hopper capacity is variable. The multi-purpose units are dust-tight at all points, keep their dust seals during filling, discharging—even while the blender is in transit.

Since all moving parts and controls are either motor driven or cylinder actuated, the new Sturtevant unit can fit into existing plants without requiring major adaptations. The entire process can be controlled from one panel.

The new unit differs from standard Sturtevant equipment in that it combines complete automation with transportability, and has two chambers—one for blending, one for storage. Atop the unit, instead of one dust-tight charging hatch, two are used. One feeds directly into the blending drum; the other into the stationary chamber. Both may be fed directly from process units. Both introduction gates are custom-engineered to customer specifications.

Sturtevant shipped the first multi-purpose unit—with a 7500-lb. capacity blending chamber—in January. The carbon-steel blender shipped (units can be fabricated of any

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desired metal) moves automatically along several hundred feet of track from point of filling to point of discharge. The track is equipped with a weight gauge to determine poundage of ingredients. When the unit arrives at discharge point, full flow-out of both chambers is accomplished through a retractable sleeve and valve that is part of the total unit. The discharge operation, like all other steps, is completely automatic.

The blender chamber is the same basic drum proved on the standard Sturtevant blenders. Its four-way blending action begins during charging, and continues during discharge to assure no loss of blend. Highly intimate intermixtures may be accomplished within four to seven minutes on most materials.

For further details, circle number 8 on CF's Information Service Bureau card, page 51.

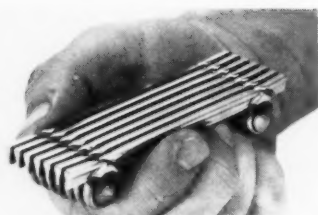
Two-direction Rupture Disk

A new impervious rupture disk works in both directions, protects against implosion and explosion at the same time, at any pressure to 150 psi., and each burst setting can be different from the other. It is designated the 'D' disk, as contrasted to the standard disk which operates in one direction only.

A typical example of 'D' disk use is double protection of permanent or portable storage tanks against internal pressure build-up to 30 psi, as well as external pressure (vacuum formation) to 5" Hg. A single 'D' disk is placed in a nozzle on the tank.

'D' disks, unlike ordinary metal rupture disks, are accurate to $\pm 5\%$ of rated burst, even at low pressures to 10 psi. (Depending upon size, they are available in burst ratings to 1 psi, accurate to ± 0.75 psi). The material of construction used is not subject to fatigue; consequently burst rating will remain constant for the full life of the disk. Burst rating is essentially unchanged at different temperatures. These disks are unaffected by practically all corrosives at temperatures to 650 F.

In addition, 'D' disks are non-porous, and mount in standard A.S.A. flanges. These 'D' disks are one of the styles of impervious graphite rupture disks manufactured by Falls Industries, Inc. For further information, circle number 9 on CF's Information Service Bureau card, page 51.



Wedge-Wire Screen

A new wedge-wire screen made of wire with thinner profiles than previously available is being introduced by Cross Perforated Metals, National-Standard Company, for screening, sifting, dewatering, sizing, washing and filtering minerals, chemicals and other products. The high, narrow profiles of the wedge wire permit more wires per area of working screen surface than other shaped-wire screens, increasing percentage open area and increasing screening capacity.

The new screens are made of stainless and carbon steels, and are furnished in rectangular, oblique angled, round and oval beds with sharp or round bends. Conical segments, cylindrical troughs and many other special shapes are available.

Screen wires are available in several profiles including slanting tapered, tapered, flanged, and diamond. The profiles eliminate blinding and clogging because any particle that passes the top will quickly clear the entire opening. Slit widths down to 0.002 inches can be furnished. Spacing lugs provide rigidity in the screen, prevent lateral deflection, and preserve uniform slit spacing.

For more complete information, circle number 10 on CF's Information Service Bureau card, page 51.

Chain and Sprocket Book

Stock sizes of Link-Belt roller chains and sprockets are conveniently listed in a new 44-page book, No. 2757, just released by Link-Belt Company.

"Keydexed" for easy reference, the book lists over 2,000 types and sizes of stock roller chains and sprockets including standard and double pitch power transmission chains, a large selection of conveyor chains and attachments, and one of industry's most complete line of sprockets.

Sprockets described in a 20-page

section include the finished bore, taper lock, mandrel bore, type D (removable segments) and shear pin types. Two pages are devoted to RC roller chain flexible couplings.

A copy of Book 2757, "Link-Belt Chains and Sprockets," can be obtained without charge by circling number 11 on CF's Information Service Bureau card, page 51.

4-Wheel Drive 'Payloader'

Frank G. Hough Co. has announced an entirely new tractor-shovel of a size and type never before available in their 'Payloader' line.

This new Model H-30 has an operating capacity of 3000 lbs. and is equipped with a one cu. yd. (S.A.E. rated) bucket.

The four-wheel-drive features Hough's full power-shift transmission with matched torque-converter. With three speed ranges in each direction, all shifts can be made 'on-the-go' with no need to stop for 'range' shifts.

The H-30 is powered with a 77½ hp heavy-duty gas engine which, according to the manufacturer, provides more power than any other four-wheel-drive unit of this size and capacity.

The clearance of 8'-4" under the cutting edge, with bucket in dumped position, is even greater than some larger machines as is the 29' dumping reach ahead of the front tires.

This compact tractor shovel features four-wheel hydraulic brakes instead of two-wheel in order to provide equal braking action in either direction. Brakes are sealed to keep out dust and dirt.

Boom structures are positioned ahead of and away from the operator to provide the utmost safety. New slope-down, front-end styling gives fullest visibility of bucket digging action. Single long-stroke hydraulic ram with high-leverage linkage to the bucket develops powerful bucket break-out action for tough digging assignments.

Accessibility as well as safety has been given special attention. Standard ladder with hand rails makes it easy and safe for the operator to get on and off. Both fuel tank and transmission can be checked and filled from ground level. A quick-opening compartment on the left side of the machine gives easy access to battery and instrument connections.

The hydraulic system of the H-30 includes an oil reservoir, which is closed and pressure-controlled with built-in cartridge-type oil filter and fine mesh strainer to exclude both dust and dirt. A separate, fan-cooled, oil-to-air radiator cools both transmission and torque-converter oil.

Dual foot brake pedals give the operator instant choice of braking with the transmission engaged or disengaged.

This new H-30 'Payloader' is scheduled for production this month and complete information and specifications may be obtained by circling number 12 on CF's Information Service Bureau card, page 51.

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Flexible Plastic Tank Liner

'Corrosion Control with Flexi-Liner' is the title of a twelve-page booklet being offered by Flexi-Liner Company. The literature describes the balloon-like liquid-tight containers that are tailored to accommodate the contents of a storage tank.

Cutaway drawings show installation and operation of the liners, and tables give mechanical and thermal properties of the materials of construction. Chemical resistance of the Flexi-Liners is shown in another table, with recommended applications of three materials used to fabricate the liners. Costs are compared with rubber-lined steel tanks and with stainless steel tanks.

For a free copy of the booklet, circle number 13 on CF's Information Service Bureau card, page 51.

'Limberoller' Idler Booklet

The Joy Series 200 Limberoller belt Conveyor idler, an improved version of the original two-bearing catenary idler introduced by Joy Manufacturing Company in 1953, is described in a new 20-page bulletin.

The Limberoller idler consists of a series of neoprene discs molded to a neoprene-covered, flexible steel wire cable suspended from two end-mounted bearings. On the new model, according to the manufacturer, cable strain is reduced by free swiveling bearing mounts and extra reinforcement between end discs.

The bulletin contains complete specifications, a detailed description of construction features, installation photographs, application instructions, and an explanation of advantages. For Bulletin LD-111, circle number 14 on CF's Information Service Bureau card, page 51.

Material-Level Indicator

How material-level indicators accurately and automatically control level of pulverized, fine, crushed or granular material in bin or silo is the subject of a new bulletin offered by Fuller Co. The general purpose model and a specially-designed model for hazardous dust conditions are discussed.

An explanation of the difference between the two models and their component parts is given, as is a detailed account of their operation. Since either model can be used as a high or low level control, a description of performance at both levels is included. Current requirements, control switches and a safety pulse switch, which indicates that the entire mechanism is in working order, are also discussed. A wiring diagram illustrates the operation of the switches.

The bulletin contains a full-page schematic drawing of a material-level indicator, a photograph of a typical installation of a vertical-mounted indicator and a drawing giving five examples of application.

For a copy of Bulletin I-5-C, circle number 15 on CF's Information Service Bureau card, page 51.

Flow Rate Regulators

W. A. Kates Company is offering Bulletin 581, a six-page two-color foldout brochure describing their new Type F self-contained direct-acting flow rate regulators. The unit is designed for use with clear liquids, light slurries and many suspensions.

They state that the unit combines measurement and control with a single force-balance system and has only two moving parts. The bulletin, containing an application data sheet, describes performance characteristics of the regulators, and features cutaway drawings of the unit.

For a free copy, circle number 16 on CF's Information Service Bureau card, page 51.

Liquid Fertilizer Pumps

'Liquid Fertilizer Handling Pumps' is the caption of two-page Bulletin 850, offered by The Deming Company. The bulletin includes specifications and applications of the Deming pumps offered especially for liquid fertilizer handling applications, and includes 13 illustrations.

For your free copy of Bulletin 850, circle number 17 on CF's Information Service Bureau card, page 51.

Liquid Handling Accessories

Bulletin F-31RE, 'OPW Products for Liquid Fertilizers,' is the new literature offering from OPW Corporation, and describes their line of products for handling of complete analysis solutions and liquid nitrogen. Couplers, nozzles, line strainers, swivel joints and sight glass indicators are all described. Materials of construction for the model recommended for each application are described.

For a free copy of the new bulletin, circle number 18 on CF's Information Service Bureau card, page 51.

Corrosion Resistance Guide

A guide listing the relative ability of metals, plastics and synthetic rubbers used in the manufacture of Flo-Ball Valves to resist the corrosive effects of 390 different fluids encountered in industry has been issued by Hydromatics, Inc.

An easy-to-read tabulation permits a rapid estimate of the effect of the fluids, alphabetically arranged, on selected materials of construction. The metals are aluminum, carbon steel, semi-steel, and 316 stainless steel; the synthetic rubbers are Buna N, Neoprene, and Viton A; the plastics are Teflon, Nylon and Kel-F.

An introduction provides a cross section of the Flo-Ball Valve and the chemical composition of the metals used in their construction. The physical characteristics and temperature range of the plastics and synthetic rubbers are also provided.

For a free copy, circle number 19 on CF's Information Service Bureau card, page 51.



Through the use of a simple assembly jig a complete pallet can be set up in less than one minute. Pieces of reinforced, gummed paper tape are used to secure the half-cores to the platform deck sheet. The completely assembled pallet is shown in the foreground.

Paperboard Pallet

A new, lightweight, disposable pallet made entirely of paperboard has been designed and successfully tested by Union Bag-Camp Paper Corporation. Industries which palletize filled bags for truck shipments have shown great interest in this development.

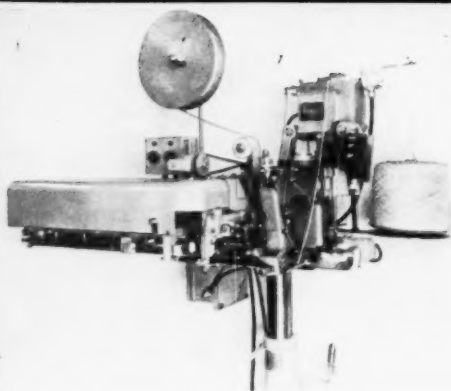
The pallet consists of a sheet of double wall corrugated board to which is attached two half-cores made of laminated kraft paperboard. These cores can be centered to fit any type of fork lift truck. As illustrated, the complete pallet can be set up by two men at the user's plant in less than one minute.

The recommended maximum capacity of the pallet is 36 bags. The loading patterns vary according to the size of the bags. One pattern is to place three bags lengthwise over each core and extend them to the edge of the pallet. This pattern forms a bottom layer of six bags. To prevent overhang of the bags in the bottom layer, the two center bags are positioned first, then the four outer bags are laid in place, slightly overlapping the center bags. Because these bags rest on a smooth, curved surface, with no nails or sharp edges, the possibility of the bags being torn during shipment is eliminated. The second layer of six bags is loaded at right angles to the first layer. The third layer is loaded the same as the first. Each additional layer is reversed, thus forming a very stable locking pattern.

Because it weighs only eight pounds compared with 97 pounds for a standard wooden pallet, the use of this disposable pallet makes possible a big savings in dead weight. In warehousing, pallets loaded with 30 to 36 bags have been stacked four high successfully. The half-cores have held up without flattening under loads in excess of 12,000 pounds.

For further information, circle number 20 on CF's Information Service Bureau card, page 51.

(Concluded on page 54)



Tape-Top Bag Closer

A Thermoplastic Tape-Top bag closing machine designed to apply a thermoplastic tape closure over

sewing on open-mouth multiwall shipping sacks has been developed by Bemis Bro. Bag Company.

The Thermoplastic Tape-Top machine, designed and built by the company's Packaging Service unit, effects a bag closure providing maximum protection against contamination, eliminates sifting of fine products. The closure creates a moisture barrier to prevent 'caking' of hygroscopic products and retains its physical and chemical characteristics over the full range of temperatures encountered in bagged products.

The unit utilizes a special thermoplastic tape, Bemistape 400, to make the new closure. The tape, a development of the company's de-

partment of physical research, is economical in cost and provides maximum strength with respect to tensile and tear.

In operation, the Thermoplastic Tape-Top bag closing machine first makes a standard sewn closure. The thermoplastic tape is immediately folded and creased over the stitches and then heat-sealed under controlled temperature and pressure to give maximum protection.

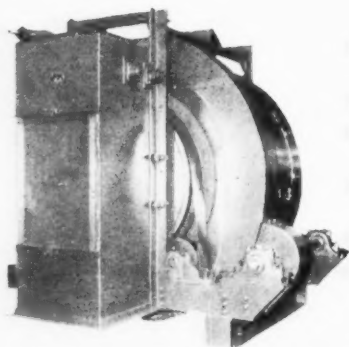
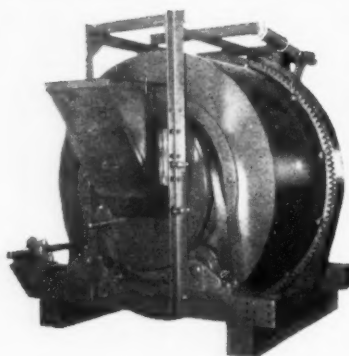
To provide maximum speed, with ease and economy of operation, automatic elements have been incorporated into the Thermoplastic Tape-Top bag closing machine, including automatic starting, thread cutting, and tape application and cutting components. Once the filled bag enters the Bemis sewing guide no further operator assistance is required.

Operational data, engineering specifications and optional features, are available by circling number 21 on CF's Information Service Bureau card, page 51.

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- Large Intake Chute Door
- Packed Seals At Intake & Discharge Ends of Drum



- Discharge Mechanism Air Or Manually Operated
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1 1/2 Ton No. 187-F 10,000lb
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Liquid Fertilizer Pumps

A new four-page, two-color bulletin covers Gorman-Rupp's self-priming centrifugals for pumping liquid fertilizer solutions.

Illustrations, specifications and performance-curve graphs are included for the series of pumps recommended for each liquid fertilizer handling operation. Aqua ammonia, nitrogen solutions and complete fertilizer solution applications are described. For a free copy of the new bulletin, circle number 22 on CF's Information Service Bureau card, page 51.

Pneumatic Rappers

A new line of Navco Air 'Rappers' for electrostatic precipitators and dust collectors has just been announced by National Air Vibrator Co.

According to the manufacturer, the air rappers are made with a patented one-piece design that eliminates 80% of the maintenance problems on precipitators and dust collectors, and have no assembly bolts to stretch and shear, or separate striking plate to leak air from the housing.

Exhaust parts on both sides of the housing keep the vibrator piston centered, so housing wear is minimized. Navco Rappers can be arranged with a solenoid valve and timer for complete automatic control, and are made for vertical mounting or horizontal mounting. Units measure 10 1/2" long by 5" wide by 9 3/4" high, and weigh 52 lbs. Air consumption at 50 P.S.I. is 9 c.f.m.

For further details, circle number 23, on CF's Information Service Bureau card, page 51.

The cheapest insurance a farmer can have against crop failure is proper fertilization says the Kentucky Department of Feed and Fertilizer.



HIS BUSINESS IS MAKING YOUR BUSINESS BETTER

*Like all the men and women in Cyanamid's phosphate operation,
his only business is phosphates for your mixed fertilizers.*

He's one of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into the kind of products and services you can use. Take advantage of both. Pick up your phone and call your Cyanamid representative.

The kinds of Cyanamid services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money, make your operation run more efficiently.

Technical Service: Cyanamid's staff of technical experts are on 24-hour alert. Often, what are new problems to you are solved problems to them. Make your formulation and production problems theirs... that's their job.

Sales Service: Cyanamid sales representatives are available to work with you and for you in expanding present markets or in establishing and developing new markets.

Products that serve: Cyanamid's only phosphate business is mining and manufacturing the highest quality products for your mixed fertilizer requirements.

They are:

- Florida Natural Phosphate Rock
- TREBO-PHOS® — The Triple Superphosphate with controlled porosity
- Phosphoric acid for acidulation

*To manufacture fertilizers that sell... mix with Cyanamid's phosphates and service. American Cyanamid Company, Agricultural Division, New York 20, N. Y. *TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.*





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"PE costs too

"These PE bags

"What's the

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CAPCOTE* PE bags...
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performance at
reduced cost!

This is the bag! No other.

An exclusive development of St. Regis packaging research, new Capcote PE bags give you polyethylene protection with superior performance—not at *greater* cost, but *less* cost! Sounds impossible. But it was *made* possible by an entirely new extruding process perfected under our Packaging-In-Depth Program. Just as St. Regis pioneered the *first* commercial PE coated sheet, so we continue to explore new ways to serve you better.

Capcote PE assures you of the most effective product protection . . . economically. Capcote PE lets you upgrade your bag specifications by replacing less efficient moisture-barrier sheets with superior moisture-resistance. Capcote PE makes your bag choice simpler. Instead of buying by weight, you determine the degree of moisture-

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much!"
you can afford!"
story?"

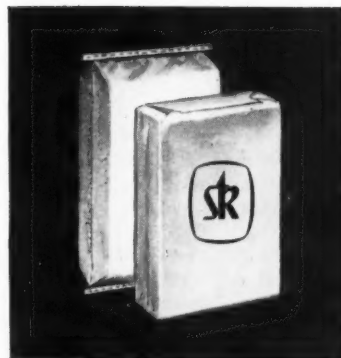
resistance you need, and pick from five grades: Capcote PE 100, 150, 200, 300 or 400.

St. Regis bag salesmen make sure you get the right sheet for the job. Capcote PE brings you greater flex life, improved adhesion and superior protection—all at lower cost.

Ask your Bag Division representative for full details. Count on him to give you the *best* buy for the *most* protection. And count on St. Regis Packaging-In-Depth for continuing research in packaging materials, equipment and methods to keep your operating costs down!

Write today for literature on Capcote PE—Dept. CF-4, St. Regis Paper Company, 150 East 42nd Street, New York 17, N. Y.

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PAPER COMPANY

The International Scene

ALGERIA

To ship gas to Europe

A liquification plant for gas that will be shipped to Europe, a plant to manufacture ammonia for use in fertilizers, a petrochemical plant, and an electrochemical plant for electrolysis of salts will be built for utilization of natural gas from Hassi R'Mel field in the Algerian Sahara, according to press releases issued by the Direction de l'Energie et de l'Industrialisation of the Delegation General in Algiers.

BELGIUM

Raises Transmission Tax

The Belgian Government has increased the rate of the forfeit transmission tax from 5 percent to 7½ percent on sodium nitrate, ammonium nitrate, ammonium sulfonitrate, ammonium chloride, ammonium sulphate, crude ammonia, calcium nitrate, ammonia calcium nitrate, magnesium and calcium nitrate, potassium nitrate, sodium and potassium nitrate, calcium cyanamide and urea.

The forfeit transmission tax on imported chemical fertilizers is paid at the time of custom clearance, and on domestically produced chemical fertilizers at the time of sale by the producer. The tax is a one-time tax and covers all subsequent transactions up to delivery to the consumer or to the industrial processor.

BRITAIN

Urged to seek Potash

The Monopolies Commission which investigated the British fertilizer industry has recommended lower prices for consumers, but said the few companies dominating the industry had not operated against the public interest.

The commission urged, however, that everything possible be done to seek and develop other sources for potash, including Canada, the U.S., Israel and Russia.

INDIA

To make sulphur

The Government of India has decided to float a subsidiary corpora-

tion to the National Industrial Development Corporation to implement the project for the manufacture of sulphur from pyrites in Amjor, Bihar, Norwegian experts who had examined the feasibility and the economics of the project, commented favourably. About 2,000 tons of the ore would be sent to Norway for large-scale tests to enable the experts to design the plant and machinery.

To buy French fertilizers

The Government also decided to import French fertilizers through the United States Government, the Minister for Agriculture said, in a reply to a question in Parliament. An allocation of about 1,005 million francs (equivalent to Rs 10 million) had been made available to India under the third country currency programme of the US Government. Tenders had been received for the supply of fertilizers for the amount and they were being examined.

Wants Sulphuric and Super Plants

In collaboration with U.S. firms, Natwarlal Shamdas & Co., of Bombay, proposes to establish several new industries, including sulfuric acid and superphosphate.

Natwarlal Shamdas are mine-owners, merchants and exporters. The company would like to negotiate with U.S. firms interested in investment in India by way of supplying capital or machinery and technical know-how to establish the manufacturing plants to make sulfuric acid and superphosphate from sulfuric acid and phosphate. The production program, at a later stage, would include phosphoric acid and other chemicals and fertilizers.

KOREA

To block profiteering

The Liberal Party policy-making committee and Administration authorities have agreed to early release of fertilizer in Government reserves in order to curb the upward price trends on the fertilizer market.

The joint discussion also led to a decision that the Government put on public sale \$18 million in ICA

aid funds with a view to blocking profiteering by civilian fertilizer dealers.

Chairman of the Liberal committee, Rep. Kyung Keun Chang, observed after the meeting that the 114,000 tons of fertilizer to be released by the Government will be sufficient for barley farms and the growing of rice seedlings.

NETHERLANDS

New construction, consolidation featured 1958-1960

New construction as well as consolidation of sales organizations took place in 1958. In February 1958, construction of a new mixed-fertilizer factory at Vlaardingen near Rotterdam along the New Waterway began. The plant will be operated by the Central Bureau National Farm Cooperatives, Rotterdam (full name, National Cooperative Purchasing and Selling Association for Agriculture) and ENCK Fertilizer Company, Vlaardingen, one of the country's largest fertilizer concerns. Late in 1958 it was announced that C.I.V. (Cooperative Central) another farmer cooperative, would join the partnership for operation of the plant and that Central Bureau would participate in operation of an insecticide plant recently established by C.I.V.

Delta-Chemie fertilizer works is scheduled for completion in the spring of 1960 and will produce primarily for export. Planned production figures have not been released, but the plant will account for an important share of fertilizers destined for the Common Market. Recently, both domestic consumption and exports have risen steadily, although there was a slight drop in 1958. Later expansion to include insecticides and other agricultural chemical products is planned.

Another example of the trend toward consolidation to face the sales challenges of the Common Market came with the decision of three large firms to form a joint subsidiary in Utrecht to distribute their fertilizers. The three firms, Albatros Superphosphate Works, N. V., Utrecht; Cocencen and Schoenmakers

Chemical Works, Veghel; and New Netherlands Spiegelglas Company, Sas van Gent, all important producers, will sell through the new subsidiary and execute certain other combined activities.

TAIWAN

Farmers learning urea use now

Fertilizer consumption in Taiwan is 659,017 metric tons of chemicals for 1957 plus several million tons of compost each year. Unlike their mainland brethren, Taiwan farmers know the value of chemical fertilizers. But how to use them effectively and safely poses a big problem.

For the last ten years, the Joint Commission on Rural Reconstruction has been in the back of government agricultural agencies in teaching farmers on Taiwan in the best way of applying fertilizers to their paddies.

To teach farmers how to apply chemical fertilizers from 600 to 1,200 field demonstration plots have been laid out across the island every year. A latest task is to demonstrate the use of urea, a high concentration fertilizer which will soon come out of the islands' own urea plant at the pace of 86,000 tons a year.

TRINIDAD

Free tree fertilizer plan

A free fertilizer scheme for a 5-year period has been planned. Funds are to be provided from local Colonial Development and Welfare allocations but must be matched by contributions from the unit governments. Growers would receive minimum requirements of artificial manure free for the first 3 years with a stipulation that no one would receive more than 15 nor less than 5 pounds per tree. In the fourth year the grower would receive two-thirds that amount and in the fifth year one-third.

Blaw-Knox Ships Buckets to South Pacific

Six round nose, hard digging buckets have been shipped to Christmas Island and other islands in the Australian-New Zealand area for use by The British Phosphate Commissioners.

The buckets, designed and fabricated by Blaw-Knox Company,

Pittsburgh, will supplement 40 other B-K units already in operation. Rated at $\frac{3}{4}$ cubic yard, the Size 671-RN buckets were ordered through Boyd, Weir & Sewell, Inc., New York, N. Y.

'Host' Garst Predicts Vanishing of Crop Rotation

By 1970 crop rotations will disappear from the farm scene, says Iowa farm Roswell Garst, whose farm was chosen for a visit by USSR Premier Khrushchev last Summer. He bases this prediction on what he calls the "nitrogen explosion"

which has produced cheap nitrogen to replace the high cost of raising nitrogen through clover.

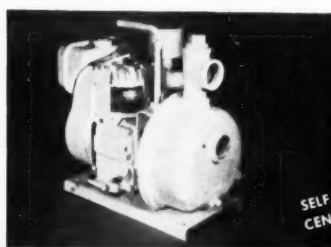
"So we are predictably going to abandon rotation" he said and inefficient crops like oats. We are going to plant corn, corn, corn on our best land and fertilize pasture on land that gives itself least well to cultivation." And in 10 years population increase probably will bring production in line with demand.

These predictions were made at a Minneapolis area farm forum early last month and before the DuPont research breakthrough (see page 60) was announced.



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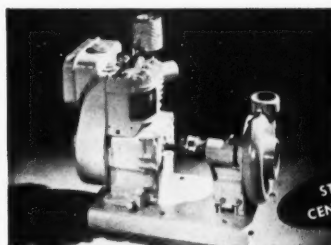
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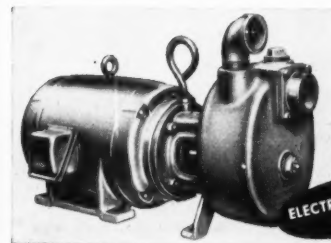
These dependable, ruggedly constructed CROWN pumps are especially designed and engineered to assure you a low cost pump that will deliver under the most demanding conditions. In a Crown pump you get fast action, long life and low maintenance costs.



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Research Results & Reports

DuPont Research Learns How Nature Makes Nitrogen

A breakthrough which may enable man to create nitrogen as nature does, either in economical production, or on the farm has been announced by DuPont fundamental research workers. Actually this is a major life process, which nature uses within a living cell to create the nitrogen compounds without which life cannot exist.

As our readers know, nitrogen as a gas is available in the atmosphere in huge quantity. But the earth's supply of fixed nitrogen must be constantly renewed because it eventually returns to the atmosphere. The 10,000,000 annual tons of fixed nitrogen not being produced is only 2% of the quantity required for fertilized crops. So most of the nitrogen used by plants is supplied by the bacteria which have nitrogen-fixing chemicals, directly or in association with such plants as peas and clover.

Industrial nitrogen fixation is a

process requiring huge plants and very high temperatures, but the bacteria can fix nitrogen at ordinary temperatures. How they do it has been a mystery, solution of which is greatly advanced by the DuPont research result.

For the first time DuPont men extracted the fixation enzymes from bacteria, and energized them into duplicating in a test-tube—and outside the bacterial cell bodies—the nitrogen fixing reaction. This accomplishment can lead to answering many important questions about nature's chemistry, and could bring about greater farm efficiency and increased food supplies in undernourished areas.

A detailed discussion will be presented by the DuPont researchers this month at the Chicago meeting of the Federation of American Societies for Experimental Biology.

Fussy Bees

Wyoming University research says that alfalfa seed fields need alkali bees. It seems these are fussy about where they live, and the University has developed plans to bury alkali bee larvae in the right location, and hope the bees that emerge will stay there.

SHORTS

Weeds are being searched out by USDA specialists, in a search for alternative crops for farmers now growing overproduced items.

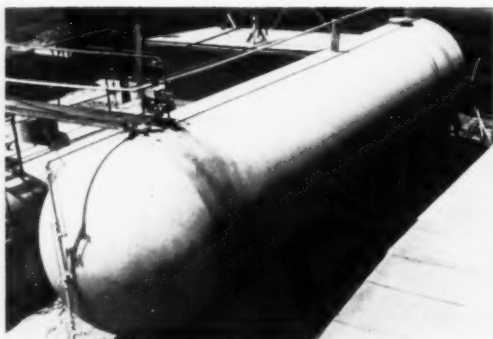
Tree farms will be completely mechanized in the future, according to MSU's Donald P. White, who also has valuable data on the value of fertilizing forest and Christmas trees. For this, write him at Michigan State.

Yule fertilizer, you might call what's going on in Toronto. This year, instead of burning their 60,000 Christmas trees, they were reduced to 300 truckloads of fine sawdust, to be stored for several years until ready to be used and sold as fertilizer.

Ozone, it develops, may be a friend to man, but not to plants. The New Jersey Plant Pathology Department calls ozone "our most important single phytotoxic air pollutant." It apparently comes from the action of ultra Violet light from the sun on nitrogen oxide which comes from open fires, home furnaces—and especially automobile engines. Thus does progress bring its own punishment!

Selective insecticide, *bacillus thuringiensis* (BT for short) is deadly to pest insects, but not to such nice insects as honey bees. USDA is running extensive tests now, and the new insecticide is expected to be launched on the market soon. It is also harmless to warm-blooded animals, such as man.

Molybdenum is beneficial to birds-foot trefoil and ladino clover at lower levels of liming in acid soil, Cornell University tests show. GLF and Climax Molybdenum are jointly sponsoring research to pursue in the field the greenhouse—proven theory that while molybdenum is not a substitute for lime it is valuable insurance against underliming.



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• COLE was first to build welded aluminum tanks for nitrate solutions, just as we have always pioneered in supplying the plant food industry with tanks or equipment for the storage or processing of agricultural chemicals. . . . Send us your inquiries for conventional or special design tanks—shop built up or field erected, using flat, flanged and dished, or hemispherical heads. Write for a copy of *Tanks and Equipment for the Plant Food Industry*.



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NEWNAN, GEORGIA

Miso and Tofu Can Sell Soy Beans

USDA reports that American surplus soy beans can be made into miso and tofu—which are major foods in Japanese diet. As they point out, this could open up even further the expanding soybean market. Japan does not grow enough for its own uses, but is working on an increasing acreage and yield.

Hydroponics Feeds His Livestock

In Ohio there are two farmers who are supplying livestock with fresh, green feed all the year around via hydroponics. They spend less than 30 minutes a day seeding the baskets and taking in the "crop". They report they get 1000 pounds of feed per 100 pounds of seed in a structure only 12 by 20 feet. The two recently held an open house.

Double Plastic Mulch Works Fine

The University of Kentucky has been experimenting with a black plastic sheet over which is a clear plastic sheet as a mulch in vegetable tests. They report that tests produced as much as double yields, which more than paid for the extra plastic sheets.

Boy Growing Space Food

You may remember some time back our story about the boy who tried to get data on plant life on planets, which the Russians finally supplied. Well, out at the Randolph Air Force Base, in Texas one George Ricker has shown a "Mars in Jars" exhibit of crops grown in what is known of climate and soil conditions on Mars and Venus . . . which may be important sooner than we think.

New Measure of Land Value

Utah State Engineering Experiment Station has issued Bulletin #6, entitled "Relative Productive Value of Land" which should be of major interest to all fertilizer people because it offers a system of measuring land value by its power to grow crops. The point: no matter how located near markets, on good roads etc., land may be, unless 3 factors are favorable it cannot yield well. These are, of course, water, climate and soil. And fertilizer is a factor in what the soil is like.

Montana Pasture Needs Nitrogen

D. E. Baldrige, Montana AES, says it pays off to fertilize irrigated grass pasture. Forage yield increased as the rate of N increased, and the average seasonal crude protein was stepped up from 14.1% to 23%, as the nitrogen rate went up from 0 to 300 lbs. per acre.

Oregon Wheat on Summer Fallow

Charles R. Rhode, University of Nebraska announces as the result of a study near Pendleton, Oregon,

that the yield of winter wheat grown on summer fallow went up between 17.8 and 33% as a result of nitrogen fertilization as compared to wheat grown on non-fertilized summer fallow. The rates varied from year to year between 26 to 40.6 lbs. of N per acre.

Hunt New Crops in Turkey

USDA has a team in Turkey, hunting out new varieties of plants which might grow in the US, and which would be valuable industrially. And back home, USDA people

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ELEVATORS
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FOR THE FERTILIZER INDUSTRY



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7'6" dia. x 15' heavy duty Continuous Combination Ammoniator-Granulator—With 40 HP motor and Renneburg exclusive motorized cam-actuated knockers. Unit handles 70 tons per hour granular fertilizer throughput.

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INSTRUMENT PANEL

"Nerve center" of this large Renneburg designed and equipped chemical fertilizer plant. Includes furnace pyrometer; temperature indicating, recording and controlling potentiometers; load indicating ammeter, and start-stop push button stations with signal lights for each machine. Audio-alarms warn operators of possible processing difficulties.



TWO RENNEBURG Heavy-Duty Rotary Units

Each 8' diameter x 50', with 50 HP fluid drives . . . for drying and cooling high analysis chemical fertilizers.

Literature and information on request.

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Pioneers in the Manufacture and Development of Processing Equipment for over 85 years.

are reversing the process, and searching for industrial uses of the plants we already have here . . . such as oil from marigold seeds.

Lime for Michigan Soils

The Michigan AES has produced Extension Folder F-279 which deals well with the use of lime on Michigan soils. They also have a fine little folder which tells how to take accurate soil samples.

Divorce Seeds from Nutrients, Virginia Says

Virginia AES says that wheat does better when the seed and the plant food do not come in contact in placement.

Animals Prefer N-fed Grazing in Wyoming

Drs. D. R. Smith and Robert L. Lang of the University of Wyoming find that 67 lbs. of N per acre will result in greater forage utilization by sheep and cattle, who show a definite preference, feed better, and produce more growth when pasture is thus fertilized. Obviously the grass grows better, and offers higher protein in such pastures.

Cherries Yield to Plant Food in Colorado

Experiments by the University of Colorado show that fertilizer will produce significant increases in yield and shoot growth of Bing Cherries. But the problem is that some years a balanced fertilizer did better, and other years plots treated with nitrogen and phosphate yielded more. But always, N helped.

Nebraska Tests Check Plastic Glazing

The North Platte AES has been busy recently demonstrating how corrugated acrylic-polyester plastic panels eliminate phototropic effects in propagating houses and hotbeds.

Tung Thrives on Alternate Feeding

The South Mississippi AES has found that tung trees do not need to be fed every year, but do all right with every-other-year feeding, especially when the crop is light. Or, better, lighten up on off years, and use only moderate applications of nitrogen and potassium. Sometimes, in fact, too high a potassium level has been found to reduce yield.

Phillips Issues Booklet On Ammonium Nitrate

A 12-page booklet, written by P. W. Tucker, R. S. Neff and A. F. Dyer, all of the company, has been published by Phillips Petroleum Co., Bartlesville, Oklahoma. Entitled "Facts you should know about fertilizer grade Ammonium Nitrate," it discusses the history, storage and use of the product. The purpose: to correct much that has been inaccurately written on the subject, due to lack of information. The booklet sets forth the facts, briefly and concisely covering the properties and other pertinent information on ammonium nitrate.

Potash Institute Offers Corn and Placement Guides

The American Potash Institute has two new folders, which they offer for sales meetings, customer services, convention exhibits and the like. Less than 100 copies are free. More are charged for at cost of production,—\$1 per 100; \$10 per 1,000.

The placement folder—when you order use #E-59 — is colorful but brief — and contains the intriguing headline "Roots grow down, not up." The corn folder (D-59) details the plant food absorbed by corn during various periods of its growth.

Write them at 1102 16th St. N.W., Washington 6, D. C. for sample copies. They are excellent sales tools.

Cyanamid Seminar For Salesmen

American Cyanamid Company recently held a Phosphates Seminar at Lakeland, Florida, for its agricultural division sales representatives, it was stated by the division's marketing director, B. F. Bowman.

Mr. Bowman said the program involved technical discussions on the fertilizer industry and future trends in phosphate marketing.

Methods of processing phosphate rock, triple superphosphate, and phosphoric acid were presented to the group by John C. Bennett, manager of the phosphates and nitrogen department, with the aid of personnel from Cyanamid's phosphate operation in Florida.

Mining and production processes were observed by touring Cyanamid's holdings at Orange Park and Brewster.

The group also visited the new phosphates museum at Bartow, which is sponsored by the phosphate industry in Florida.

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PEOPLE

(Continued from page 49)

Idaho Phosphate Works, according to J. P. Cairns, administrative vice president who in recent weeks has served as manager following resignation of A. L. Stutts, January 13.

Mr. Tillotson has served as a plant engineer, chief engineer and vice president in charge of manufacturing with two major industrial minerals firms . . . U. S. Gypsum Co. and American Rockwool Corp.

AAC

Several changes have been announced in the production staff at



Martin

The American Agricultural Chemical Company by D. S. Parham, vice president in charge of production for the Company.

H. L. Martin, Jr., former general maintenance superintendent

was named manager of the Engineering and Construction Division. He replaces Roy Simm, who retired



Jaeggi



Ward

after 45 years service with the Company.



Vetter



Foster

Allen Jaeggi, a member of the production and engineering departments since 1949, was named assistant manager of the Engineering and Construction Division.

S. D. Ward, former Northeast Division superintendent, becomes assistant general superintendent for fertilizer production. He will assist

General Superintendent R. M. Richey.

A. F. Vetter, former Northeast Division maintenance superintendent, was named maintenance superintendent. He will also be responsible to General Superintendent Richey.

E. M. Foster, former foreman at the Company's Cleveland plant, becomes assistant superintendent at that location.

Spencer

The board of directors of Spencer Chemical Company elected a new director March 22, Ralph L. Gray of Kansas City, chairman of the Armco Steel Corporation, to fill the vacancy created by the death of Kenneth A. Spencer, late chairman of the board and founder of the company, who died February 19. The Board also named company President John C. Denton as chief executive officer, and C. Y. Thomas, formerly vice-chairman of the Spencer board, was elected chairman.

Mr. Denton said that Mr. Gray will be a valuable addition to the board because of his broad management experience as the chief executive officer of one of the nation's major manufacturers; he has been associated with Armco Steel Corporation since 1930.

Pacific Chemical-Fertilizer

Control of Honolulu's Pacific Chemical and Fertilizer Company shifted last month as George W. Murphy moved in as board chairman. The board has been reduced from nine to five members, and now includes Robert C. Ching, Vernon O. Bortz, C. C. Cadagan and Harold C. Eichelberger.

Mr. Bortz is secretary; Mr. Cadagan and Mr. Eichelberger are no longer vice-presidents. Otherwise no officer changes have been made, and none are expected. Ronald Q. Smith is president; J. S. Williamson is vice-president; G. A. W. Hart is treasurer and assistant secretary.

Velsicol

The following appointments were announced by Velsicol Chemical Corporation: John F. Kirk, vice-president since 1954 and a member of the board of directors since 1958, was named executive vice-president of the company.

Bernard H. Lorant, previously assistant to the president in charge of research, was named vice-president in charge of research and was elect-

NO MAJOR REPAIRS IN 25 YEARS*

Sturtevant Construction Assures

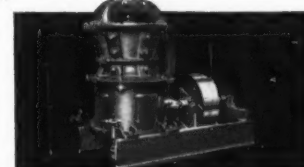
Long Mill Life at Top Loads

Sturtevant crushing and grinding machinery answers the long life top-load production problem for medium to small size plants. Many Sturtevants have been operating above rated capacities for more than 25 years, and without a major repair.

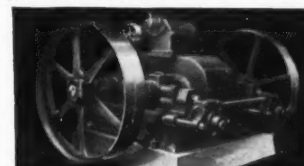
"Open-Door" design gives instant accessibility where needed — makes cleanouts, inspection and maintenance fast and easy. Machines may be set up in units to operate at equal quality and capacity.



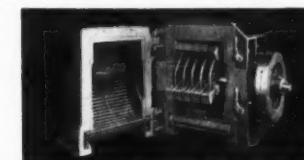
Jaw Crushers — Produce coarse (5 in. largest model) to fine (1/4 in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. Request Bulletin No. 062.



Rotary Fine Crusher — Reduce soft to medium hard 3 to 8 in. material down to 1/4 to 1 1/4 in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. Request Bulletin No. 063.



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. Request Bulletin No. 065.



Hammer Mills — Reduce to 20 mesh. Swing-Sledge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30 1/2 in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12 1/2 x 24 in. Request Bulletin No. 084.

*Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.

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Birmingham Alabama

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HUNTINGTON MEMPHIS NEW YORK

Formerly Industrial Division, Continental Gin Co.

ed to the board of directors.

A. B. Chadwick was named vice-president in charge of manufacturing and engineering. Mr. Chadwick was formerly director of manufacturing and engineering.

Owens-Illinois

John W. Luce, veteran industrial engineer, has been appointed assistant to Tom W. Brown, Jr., division manager of the Multiwall Bag Division of Owens-Illinois Glass Company.

Mr. Luce will direct research and new product development, including work on improvements in customer's material handling methods and development of new types of flexible packaging to meet customer needs. He joined Owens-Illinois in 1936 and has worked for more than 20 years in the company's industrial engineering program, concentrating during the past 10 years on mechanization and materials handling phases of industrial engineering.

Joseph L. Prosser Co.

Joseph L. Prosser announces formation of a new firm offering engineering and consulting services to the plant food industry, with personnel experienced in preparation of feasibility studies, preliminary economic surveys, building and equipment layouts, cost estimates, final machinery arrangements, and engineering drawings and specifications for new construction or plant modifications. The company will also offer field supervision for machinery installation and construction phases, including complete project management.

Known as Joseph L. Prosser Co., Inc., the firm is located on Meadowcliff Rd., Glenarm, Md., telephone LYric 2-9800. Mr. Prosser, former chief engineer for a major fertilizer manufacturing firm, and more recently service and construction manager for a leading fertilizer plant equipment manufacturer, heads the new company.

Highway Equipment

Appointment of Clayton M. Porter as division manager for Highway Equipment Company, Cedar Rapids, Iowa, was announced by Gale E. Allen, general sales manager. Mr. Porter will cover the States of Indiana, Ohio, Kentucky, Michigan, West Virginia, Virginia, Western Pennsylvania and Garrett and Allegheny counties in Maryland.

Westvaco

West Virginia Pulp and Paper has appointed Tom R. Jones as sales representative for its multiwall bag division in western New York state

succeeding George H. Doherty, retired. Mr. Jones will continue to serve clients in Pittsburgh and western Pennsylvania in addition to his new territory, according to R. C. Masoner, district sales manager for Westvaco in Columbus, O.

Schelm Brothers, Inc.

Ben J. Titus, appointed a representative of Schelm Brothers, Inc., has an extensive background in the fertilizer field. Formerly with the



Titus



Meixner

Kos-Gro Corporation, the U. S. Liquid Corporation and the Aylco Fertilizer Corporation, he knows the problems of the fertilizer manufacturer as well as the dealer, and understands the equipment used in the storage and spreading of liquid fertilizers.

Mr. Titus will maintain a stock of replacement parts for Schelm nitrogen solutions and liquid mixed fertilizer equipment in Carmel, Indiana. Mr. Titus' territory for the Fertilizer Equipment Division of Schelm Brothers Inc. includes Indiana, Michigan and Kentucky.

Dr. Edward M. Meixner, owner of Farm Crop Soil Service, retail establishment for nitrogen solutions and liquid mixed fertilizers in Ft. Recovery, Ohio, has recently been appointed distributor for Schelm nitrogen solutions liquid mixed fertilizer equipment. Distribution covers all of Ohio and part of Indiana.

Simonsen Mfg.

Merle W. Simonsen, manager of the Simonsen Mfg. Co., Quimby,



Morgan

Iowa, announces the appointment of James Morgan to sales-service representative. He will service the complete line of Simonsen bulk feed bodies and Simonsen bulk

fertilizer spreaders.

Mr. Morgan has been with the company for four years. His territory will be southern Iowa, Missouri, Kansas, and Nebraska. For the present he will operate out of Quimby, Iowa.

COLORADO

The importance of fertilization to the intermountain rancher and to our whole agricultural economy was the theme of the recent Intermountain Meadow and Range Fertilization Conference, held at Ft. Collins, Colorado.

Over 150 ranchers, range managers, university and USDA agricultural workers, and industry representatives attended this day-long conference sponsored by the National Plant Food Institute and the Colorado Cattlemen's Association, marking this first venture of its kind a distinct success.

MONTANA

An accelerated soil fertility program which would put an estimated \$1.5 million more dollars in Flathead County farmers' pockets got an enthusiastic send-off at a Flat-



MONTANA PLANT FOOD ASSOCIATION ELECTS NEW OFFICERS

New officers for the Montana Plant Food Association were elected at a meeting held at Bozeman recently. Front, left to right, are Warren Stensland, secretary-treasurer (Cominco Products); Homer Turner, President (Anaconda Co.); Lars Gallup, vice-president (Whirly Soil Service); back row, Bill Aldworth, director (Farmers Union Central Exchange); Bernard L. Brown, director (Montana State College); Lyle Ekstrom, director (Anaconda Co.)

head Agricultural Council meeting on March 8. The Kick-Off Banquet is the first phase in an intensified soil fertility program that is being sponsored jointly by the Montana State College Extension Service and the National Plant Food Institute. Walt Mauritson, county extension agent and Bernard L. Brown, soils extension specialist, are the leaders of the program.

ROCKY MOUNTAIN

The Rocky Mountain Plant Food Association election recently held produced this list of officers: President, Robert Pitcher, Colorado Plant Food Company; vice-president Ed McMillan, Spencer Chemical; secretary-treasurer, John Heitz, Colorado Milling. Immediate past president is George Fleming, Farm Chemicals Co.

Directors include R. D. McMurtry, McMurtry Seed and Fertilizer; Art Malowney, Phillips Petroleum; Frank Hall, Rodney Elevator; R. E. Monteith, Simplot Soilbuilders; Vic Touslee, Eaton Potato Growers Assn.

ASSOCIATION ACTIVITIES



MEMBERS OF THE RECENTLY ORGANIZED KANSAS PLANT FOOD COUNCIL

are pictured at their recent meeting at Manhattan. Seated, (left to right) Tom Hruza, Allied Chemical Corp.; Dr. Floyd Smith, Kansas State University; A. H. Stephenson, Consumers Cooperative, chairman; Robert M. Easley, Olin Mathieson Chemical Corp., secretary; and Arlan D. Woltemath, National Plant Food Institute. Standing, (left to right) R. V. Olson and E. A. Cleavenger, Kansas State University; Robert Gunter, Kansas State Board of Agriculture; George Wickstrom, American Potash Institute; D. R. McHard, Kaw Fertilizer Service; F. L. Douthitt, Davison Chemical Co.; and Dr. Robert Bohannon, Kansas State University. In response to an invitation by the Kansas Grain & Feed Dealers Association, the Council will participate in the association's annual meeting at Wichita, April 21-23, with a panel discussion on "Profitable Merchandising of Fertilizer." Panel members will include Mr. Stephenson, Dr. Bohannon and three dealers.

TENNESSEE

Teams of college and industry agronomists have held a series of fertilizer and seed dealer meetings across the state of Tennessee. These extension sub-district meetings have been held at Gallatin, Lewisburg, Dickson, Cookeville, Cleveland, Mont Eagle, Jonesboro, Morristown, and Knoxville, Huntington, Selmer, Covington, and Dyersburg.



UTAH

Paul Christensen, soils extension specialist for Utah State University, discussed the recently published Fertilizer Recommendation Bulletin at the Utah Fertilizer Industry Conferences held in February at Ogden and Provo. Other speakers on the two-day program included Elmer Christensen, Utah State chemist; J. P. Thorne and H. B. Peterson, Utah State University; and F. Todd Tremblay, National Plant Food Institute.

Black Heads S.W. Industry Group

L. G. Black, Ark-Mo Plant Food Co., Corning, Ark., was elected chairman of National Plant Food Institute's Southwestern Industry Advisory Committee at a meeting

← QUEBEC

Dr. Ernest Mercier (left), director of the federal experimental farm at Lennoxville, Que., was honored by Quebec Fertilizers Inc. at its agronomic meeting Feb. 24 for his contribution towards agriculture in Quebec. Dr. Mercier was presented with a leather brief case by Jean Leclerc, president of Quebec Fertilizers Inc. and chief chemist of the Montreal soil laboratory of Canadian Industries Limited.

Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
June 12-15	National Plant Food Institute	Greenbrier Hotel	White Sul. Spgs., W. Va.
June 21-22	Southern Control Officials	Riverside Hotel	Gatlinburg, Tenn.
July 13-15	Pacific N. W. Fertilizer Conference	Hotel Utah	Salt Lake City
July 27-30	Southwest Fertilizer Conference	Galvez Hotel	Galveston, Texas
Sept. 29-30	Northeast Fertilizer Conference	Hotel Hershey	Hershey, Pa.
Oct. 5-6	Southeast Fertilizer Conference	Biltmore Hotel	Atlanta, Ga.
Oct. 17-18	Fertilizer Safety Section	LaSalle Hotel	Chicago, Ill.
Nov. 2-4	Fertilizer 'Round Table'	Mayflower Hotel	Washington, D. C.
Nov. 9-11	National Fertilizer Solutions Assn.	Peabody Hotel	Memphis, Tenn.
Nov. 13-15	California Fertilizer Association	del Coronado Hotel	Coronado, Calif.

last month in New Orleans.

He succeeds Stanley Hackett as chairman. Tom Wright, Texas Farm Products Co., Nacogdoches, Texas, was named vice chairman.

At the meeting, the committee went on record proposing:

1. The Institute study the feasibility of sponsoring a regional meeting on fertilizer manufacturing problems and technology, with a portion of the program devoted to safety in fertilizer plants.

2. Research efforts in the Southwest should be continued in the coming year at about the same level as during 1959-60.

3. NPFI should continue its work in securing promotional projects with State bankers associations at about the same level as in the past year.

Grant: \$2500

A large scale forage crop fertilization demonstration project is being continued for another year in North Carolina. The project was initiated in the Fall of 1958 and is under the supervision of Sam H. Dobson and Carl Blake, extension pasture specialists with the North Carolina AES. This project has been and is being supported by an annual grant of \$2,500 from the National Plant Food Institute.

One of the greatest potential sources for increased agricultural income in North Carolina is in the area of livestock and livestock products. One of the chief bulwarks to more efficient livestock production, however, is the supply of an economical source of feed, particularly roughage. Mr. Dobson believes that much of the feed problem in North Carolina results from inefficient forage crop production caused by improper lime and fertilizer practices. By following practices suggested by the College, livestock farmers in North Carolina can increase their income by literally millions of dollars each year.



S-D PLANT CITY WINS AGAIN

For the fourth consecutive year, the Presidential Safety Trophy has been awarded to employees of the Plant City operation of Smith-Douglass Company, Inc., for their outstanding safety record during 1959. R. M. Wilbur, (left), manager of the Florida operation, accepted the gold trophy on behalf of the employees, which was presented by Smith-Douglass Director of Safety and Labor Relations C. T. Newnam. The Presidential Trophy is presented each year to one of the 18 Smith-Douglass plants which achieves the best safety record for the calendar year.

Cyanamid Winners

Winners of American Cyanamid Company's "Haymaker Contest" for fertilizer dealers in the Northeast were recently announced by the agricultural division. More than five hundred dealers participated in the contest.

The contest was built around Cyanamid's eight-page detachable insert titled "How to Harvest the Hidden Milk on Your Farm," which appeared in the January issue of Farm Journal, and was reported here at the time. Contestants were asked to figure the number of extra days a cow can be carried on an acre of urea-fertilized grass.

The dealer winning first prize with the correct answer of 201 days was presented a Winchester, Model 50 shotgun on behalf of the agricultural division by American Cyanamid Company's district manager, Fred W. Overton and sales representative Joseph W. Dearen.

Obituaries

D. S. Aitken, 69, retired Canadian Industries Ltd district salesmanager, founder in 1911 of his own fertilizer company and with C-I-L from 1935 to his retirement in 1957, died February 29 of a heart attack while trying to extricate his car from a snowbank, in Chatham, Ontario, Canada.

Herbert A. Brothers, 76, a retired vice-president of Stadler Fertilizer Co., Cleveland, died at his home in London, Ohio, March 10.

Charles F. Burroughs, Sr., 88, board chairman of F. S. Royster Guano Co., who has been ill for 3 months, died February 24 in Norfolk, Virginia. His entire life employment was with Royster, beginning at age 10; was executive vice-president before he was 30; became president in 1928 on the death of Mr. Royster. His son, Charles, Jr., is now president of Royster.

Archibald Dryburgh, retired late in 1959 as board chairman of Aberhill Works, Methil, Fife, Scotland, after 32 years as its leading figure.

J. Raymond Myers, 55, fertilizer production manager for the five plants of Eastern States Farmers Exchange, died suddenly from a cerebral hemorrhage March 6 at his home in York, Pa.

Frank S. Post, 49, for 21 years with Long Island Produce & Fertilizer Co., Riverhead, L.I., N. Y., died suddenly at Riverhead, March 1. He was assistant manager of the fertilizer division.

Merle W. Whipple, former president of Olds & Whipple, Hartford, Connecticut, merged in 1957 to form Hubbard-Hall Chemical, died early last month after a long illness.

R. D. Thomas, vice-president of Blackshear Manufacturing Co., Blackshear, Georgia, died March 11.

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CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	February		January		Oct.-Dec. Qtr.		July-December		January-June		YEAR (July-June)	
	1959	1960	1960	1959	1959	1958	1959	1958	1959	1958	1958-59	1957-58
Alabama		56,732*	20,335	22,378	89,701	108,599	180,959	199,250	846,309	734,077	1,045,574	906,798
Arkansas	22,095	21,308	9,422	8,769	16,911	21,667	58,714	63,767	289,365	226,889	353,132	289,641
Georgia	32,254	41,056	39,496	40,246	161,460	187,378	297,138	294,751	1,130,998	944,618	1,425,749	1,214,147
Kentucky		45,763*	62,564	56,608	59,451	60,108	108,734	99,460	491,920	435,023	583,281	523,794
Louisiana		13,776*	8,576	10,101	31,468	34,219	66,744	64,152	201,642	188,409	265,794	252,601
Missouri		30,831*	12,602	24,637	124,202	198,141	272,014	362,437	563,055	420,615	926,111	755,927
N. Carolina		133,076*	69,754	99,676	115,087	138,453	175,533	228,055	1,468,704	1,261,685	1,696,759	1,461,131
Oklahoma	5,440	7,990	2,617	2,883	26,572	25,438	72,511	68,848	64,738	55,594	133,586	107,400
S. Carolina	57,015	87,345	30,971	56,071	57,460	76,102	104,903	134,202	756,100	615,733	890,302	732,607
Tennessee		32,137*	34,738	17,374	38,359	47,773	117,275	127,116	443,602	307,182	570,718	442,899
Texas	51,647	61,617	26,946	38,325	117,901	119,006	233,410	222,800	441,851	452,327	664,651	666,128
California		(reports compiled quarterly)			253,956	247,473	457,956	453,800	803,261	679,577	1,254,028	1,121,546
Mississippi		(reports compiled quarterly)				86,865*		176,371*	516,917	472,791	693,288	641,262
Virginia		(reports compiled quarterly)			72,546	84,147	141,177	160,178	618,965	549,773	779,143	690,556
Indiana				(reports compiled semi-annually)			321,956	316,341	856,316	795,506	1,172,657	1,080,465
New Hampshire				(reports compiled semi-annually)				4,746*	16,143	16,053	20,889	20,019
TOTAL	168,451	219,316	318,021	377,068	1,165,074	1,348,504	2,609,024	2,971,528	9,509,886	8,155,852	12,475,662	10,906,901
----- (not yet reported) * Omitted from column total to allow comparison with same period of current year.												

CLASSIFIED ADVERTISING

USED EQUIPMENT FOR SALE

FOR SALE: Ordinary superphosphate manufacturing equipment (used) consisting of 2-ton Stedman pan, lead measuring boot, Stedman beam scale and hopper, elevator, screw conveyors, etc. Reply Box # 4, % Commercial Fertilizer, 75 - 3rd St., N. W., Atlanta 8, Ga.

FOR SALE: 6' x 50' and 7' x 80' Rotary Dryers, 3 - Louisville 6' x 50' Rotary Steam Tube Dryers; also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. BRILL EQUIPMENT COMPANY, 37-61 Jabez St., Newark 5, N. J.

FOR SALE—Stainless steel and Chemical tank trailers, pressure and Non-pressure—304 & 316 stainless. We have complete line of used and new tank trailers. Call us collect, Mayfair 1-2363, Write or wire Hackett Tank Company, Inc., 541 South 10th St., Kansas City, Kansas.

FOR SALE: Unused Sturtevant #9 rotary blender, 150 cu. ft. Sprout Waldron 335 cu. ft. horizontal ribbon mixer, UNUSED. Type 304 stainless steel dry material handling installation including: 1800 cu. ft. weigh hoppers, bucket elevators, shaker and screw conveyors, etc. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

RATES: single issue, 8c per word; two issues, 12c per word; three issues, 15c per word; add 4c per word for each insertion beyond three issues. 'For Sale', 'Exchange' and 'Wanted' advertisements accepted for this column must be paid in advance.

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ASST. SALES MANAGER—Midwest Multiple plant operation has opening for aggressive person who desires to use knowledge and skill for advancement. Complete resume, age, experience and availability first letter. Box #5, % Commercial Fertilizer, 75 Third St. N. W., Atlanta 8, Ga.

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